THE WESTERN EUROPEAN MARKET

FOR COMPUTER SOFTWARE AND SERVICES

1988 - 1993

INPUT

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The Western European Market for Computer Software and Services: 1988-1993

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Abstract

This report examines the performance, status and growth potential of the computer software and services industry in Western Europe. The report covers the Western European country markets of France, Italy, the United Kingdom, West Germany, Belgium, Netherlands, Sweden, Norway, Denmark, Finland, Spain, Switzerland, Austria and Ireland.

The computer software and services industry is defined by INPUT as comprising six major sectors—processing services, network services, software products, systems integration, professional services and turnkey systems.

Each sector is examined with respect to major trends, market dynamics and issues. Estimates of sector and country market growth are given together with size and growth estimates up to 1993. In addition, the dynamics of each country market are reviewed together with an analysis of the market by vertical industry sector.

The report also discusses the economic and strategic position of the computer software and services industry in Western Europe in comparison with the U.S. market.

This report contains 270 pages, including 207 exhibits.

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1

Introduction

1 Introduction

This report is produced as one of a series of reports in INPUT's Software and Services Planning Services for the Computer Software and Services Industry in Western Europe.

A Scope of the Report

This report reviews and analyses the six major sectors that constitute INPUT's definition of the computer software and services market.

- Processing services
- Network services
- Software products
- Systems integration
- Professional services
- Turnkey systems

This six sector definition represents a change from the analysis included in INPUT's 1987 programme reports which was based on a four sector analysis. The two additional sectors now separately identified are network services and systems integration. Appendix D, provides a reconciliation between INPUT's current and 1987 assessments of the computer software and services market.

The report is designed to assist vendors in:

- Identifying new markets and product opportunities
- Assessing product and marketing risk exposure
- Allocating research, development, and operational resources
- Obtaining insights into market developments

The report describes and reviews the state of the computer software and services market in Western Europe in 1988 and presents a forecast through 1993.

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The report discusses the key trends and strategic issues for vendors operating in the computer software and services business.

INPUT has analyzed the Western European country markets of France, Italy, the United Kingdom, West Germany, Sweden, Norway, Denmark, Finland, Spain, Switzerland, and Austria, as well as the Rest of Europe (Ireland, Portugal and Greece).

There have been a number of changes in terminology in this report from that used in previous INPUT reports. These changes have been made with the aim of more clearly representing the activities within the industry. These changes are:

- The terms "computer software and services" or "software and services" are preferred to "information services,"sometimes used to mean library or other information services not dependent upon computers and computer software.

- The term "turnkey systems" replaces the previously used "standard turnkey systems" in recognition of the need to customize systems in some sectors of the market.

Additionally, INPUT has now standardised on the more generally accepted term "compound annual growth rate" (CAGR) rather than the previously used term "average annual growth rate" (AAGR), which is open to interpretation as implying a fixed-percentage increment.

Changes in the structure of the "computer software and services" market, as defined by INPUT for 1987 and 1988 compared to previous years, are discussed in Appendix D, Reconciliation.

B
Methodology

This report is based principally upon research activities conducted by INPUT during 1988:

- A vendor research programme with over 400 software and service vendors across Europe interviewed.

- INPUT's continuous research into the the computer software and services industry in Western Europe

For the vendor research programme, interviews were conducted in the Western European countries included in this study. Interviews were conducted on a face-to-face basis and by telephone and mail.

The second element in the research efforts that contributed to this report was INPUT's continuing studies of the computer software and services industry. Previous studies by INPUT of the market, company state-

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ments, press releases, news reports, and company financial information were all utilised by INPUT in researching this report.

Individual country markets were assessed in local currency at current rates. For comparative purposes, the assessments of individual country markets have been converted into U.S. dollars. The exchange rates used are illustrated in Exhibit III-2. Definitions of the terms used in this report are included in Appendix A.

Enquiries and comments regarding this report and any related topics of interest are welcomed by INPUT. INPUT would like to express its thanks to all those companies and individuals who participated in the research undertaken for this report.

C

Report Structure

The remaining chapters of the report are organised as follows:

- Chapter II is an Executive Overview, providing a summary of the contents of the entire report.

- Chapter III describes INPUT's assessments of the dimensions of the computer software and services market and its main constituent sectors, current and predicted growth rates, and forecasts for the medium and longer term. Vendor rankings and market shares of the leading thirty European players are also included. It also addresses some of the major issues that are impacting the software and services market environment.

- Chapter IV provides more detailed analysis of the six main sectors of the software and services industry defined by INPUT—i.e., processing services, network services, software products, systems integration, professional services and turnkey systems.

- Chapter V provides a detailed analysis of the dynamics of each country market covered in this report. It includes market commentaries, forecasts and vendor rankings.

- The appendices provide a definition of the terms used, and a list of related INPUT reports. Also included as an appendix are the detailed year-by-year forecast figures, from which the exhibits in the report are derived, a reconciliation of INPUT's previous and current assessments of the 1987 market size, and an analysis of the research sample.

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II

Executive Overview

II

Executive Overview

A

1988 European Software and Services Industry Outlook

The outlook for the computer software and services market in Western Europe in 1988 is vitally influenced by four critical trend areas, as listed in Exhibit II-1.

EXHIBIT II-1

1988 EUROPEAN SOFTWARE AND SERVICES INDUSTRY OUTLOOK

- Mergers/Acquisitions
- Internationalisation of the Market
- Increasing Importance of U.S. Vendors
- Influence of Hardware Manufacturers

The European computer software and services market has seen tremendous merger and acquisition activity over the last few years. As the industry matures, some very large European-owned companies are emerging.

Following the consolidation that has taken place recently, there are now four European-owned independent vendors whose worldwide revenues for 1987 exceeded $400 million. These are Cap Gemini Sogeti, SD-Scicon, Sema Group and Finsiel. This contrasts to the situation in 1985

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when only two companies (Cap Gemini Sogeti and Scicon) had revenues of more than $200 million.

However, the market is still very fragmented, with thousands of small companies taking advantage of niche opportunities. Small- and medium-sized companies face the possibility of being bought out or getting into difficulties, as the consolidation trend continues and competition increases.

More companies are now looking beyond national boundaries in an attempt to broaden their markets. A few truly international players are emerging. Partly in anticipation of the single European market after 1992, many vendors are seeing the necessity of looking on the whole of Europe as their "home" market rather than as individual countries.

For U.S.-owned vendors, Europe is seen as an increasingly important market. All the major U.S. hardware manufacturers showed higher growth in Europe in 1987 than they did in North America. Most of the major U.S.-owned software product companies reported huge growth in their revenues in Europe. The weakness of the dollar has made the European market particularly attractive for these vendors in the last few years.

Hardware manufacturers are continuing to concentrate more of their efforts on software and services. They are developing strategic partnerships in order to strengthen their positions, particularly in systems integration and software products.

The result of the consolidation and internationalisation of the market and the more active participation of the hardware manufacturers is that competition is likely to become increasingly tough in the European market over the coming years.

B

Market Sector Analysis

INPUT estimates that the overall market for computer software and services in Western Europe reached $43 billion in 1988; see Exhibit II-2.

INPUT also estimates that this market will grow at a compound annual growth rate (CAGR) of 19% to exceed the $100 billion level by 1993.

The highest levels of growth will be in the network services and systems integration sectors, which will grow at compound annual rates of 28% and 26% respectively. Each will increase its absolute share of the market, though starting from a relatively small base in both cases.

Both software products and professional services are expected to grow strongly, at compound annual rates of 22% and 20% respectively. By 1993, these two sectors will each account for over 30% of the total

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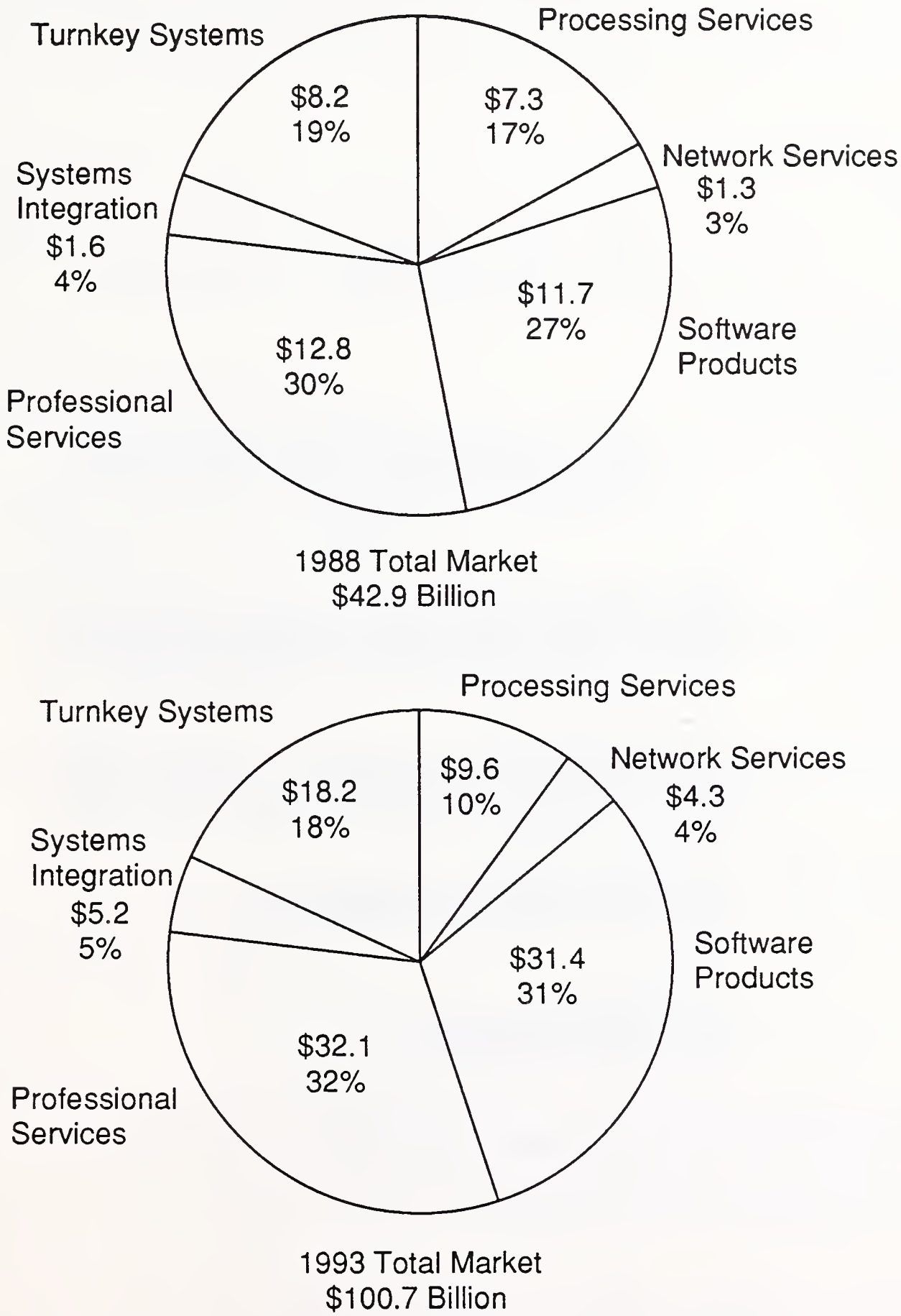
EXHIBIT II-2

MARKET SECTOR ANALYSIS
SOFTWARE AND SERVICES INDUSTRY



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computer software and services market. The turnkey systems sector is expected to grow at a slower than average rate of 17% per year between 1988 and 1993.

Processing services is expected to achieve only 6% average growth to 1993. Thus, this sector, representing over 17% of the market in 1988, will fall to less than a 10% share of the 1993 market.

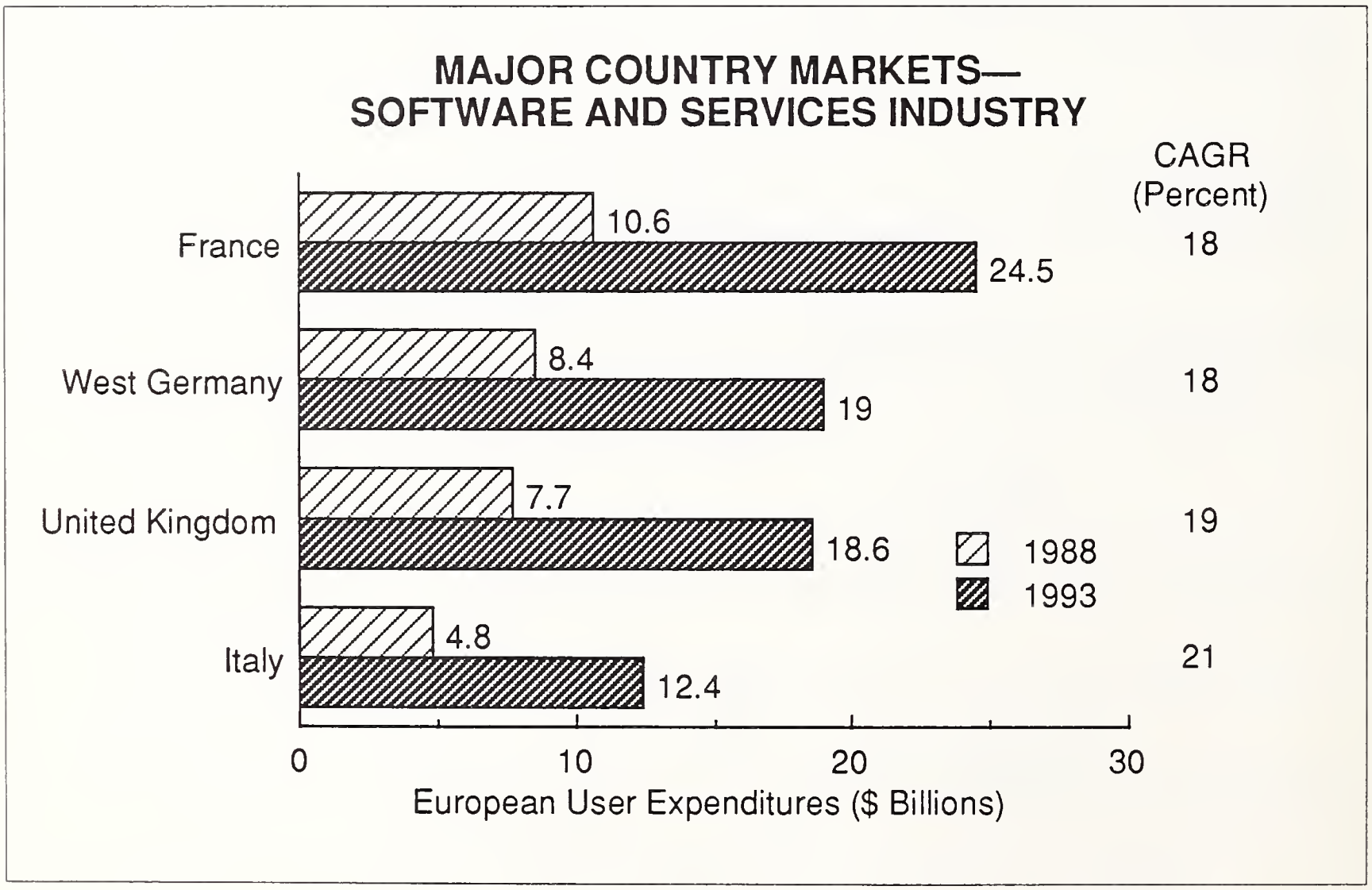
Each of these sectors is discussed in more detail in Chapter IV.

C

Major Country Markets

The software and services market sizes for the four major Western European countries are shown in Exhibit II-3, with INPUT's expected growth rates. It should be noted that INPUT's forecasts are in current dollars and hence include an allowance for inflation.

EXHIBIT II-3



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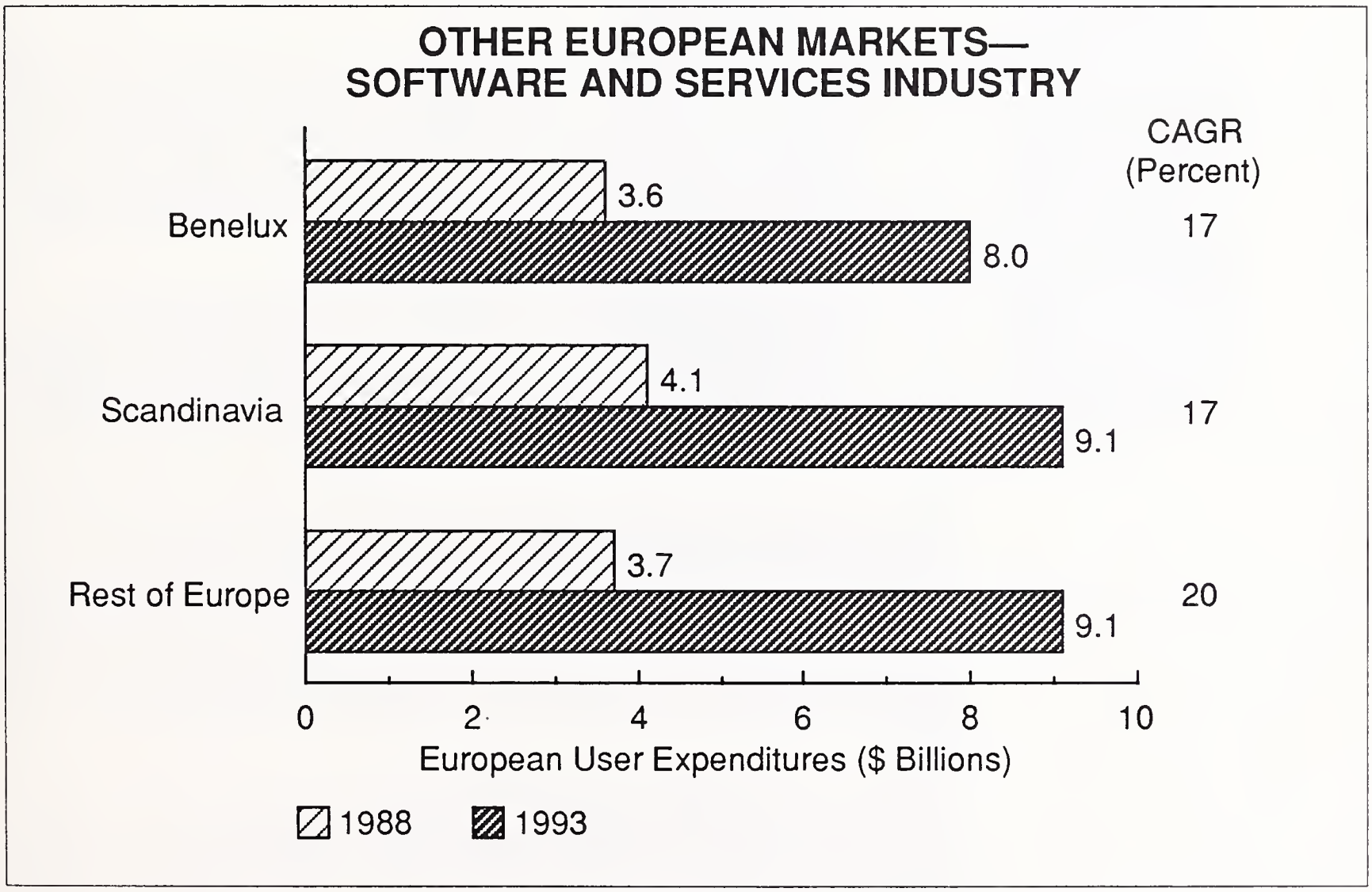
The markets in France, the U.K., and West Germany are expected to grow at similar rates. Italy, while starting at a lower base, will show faster growth. France, meanwhile, will remain by far the largest single country market.

D

Other European Markets

The other Western European country markets covered in this report are grouped in this executive overview under the headings of the Benelux, Scandinavia and the Rest of Europe, as shown in Exhibit II-4.

EXHIBIT II-4



The market for software and services in the Benelux countries will grow from $3.6 billion in 1988 at a compound annual growth rate of 17% to reach $8 billion in 1993. The Netherlands share of this market will remain at about 64%, with the remaining 36% coming from Belgium/ Luxembourg.

The total Scandinavian market is expected to grow from $4.1 billion in 1988 to over $9 billion by 1993, representing an average annual growth

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rate of 17%. The largest single country market in Scandinavia is Sweden, followed by Denmark, Norway and Finland, in that order.

INPUT estimates the market for information services in the Rest of Europe to be $3.7 billion in 1988. The expected annual rate of growth to 1993 is 20%, which will result in a market of over $9 billion by 1993. The larger country market in the Rest of Europe is Switzerland. This is followed by Spain, which is expected to show fast growth. The remainder is made up mainly of Austria, Ireland and Portugal.

Forecast figures on each individual country are given in the body of the report in Exhibit III-13, and the markets are discussed in some detail in Chapter V.

E

Processing Services Developments

INPUT forecasts that the processing services sector will achieve a CAGR of 6% to expand revenues from $7.3 billion in 1988 to $9.6 billion by 1993. Exhibit II-5 shows the analysis of this growth into the two sectors of transaction and utility processing and facilities management (operations management).

The growth rate for transaction and utility processing services is expected to be low for the period 1988 to 1993, averaging around 5% per year. It will however, still be a very important market, with particular opportunities presenting themselves in niche areas such as payroll and financial systems, for example.

INPUT estimates that the facilities management market (vendor-owned hardware contracts only) will grow from $0.5 billion in 1988 at an annual average rate of 17% to reach $1.1 billion by 1993. Recent years have seen an increasing interest in facilities management, driven by the increasing complexity of running large computer installations and often multivendor sourced and dependent upon data communications networks.

Overall, the processing services sector is becoming increasingly dominated by large players. This has resulted from consolidation via acquisitions, joint ventures and strategic partnerships. Two of Europe's leading processing companies, the French company CCMC and Datev of West Germany, have been meeting regularly for the past five years to discuss ways of improving their service to clients. They do not have any legal or financial agreements. CCMC was itself taken over by another, much smaller, French company, Concept in 1988.

F

Network Services

INPUT now recognises network services as an independent sector, hitherto included within the processing services part of the market. The network services sector consists of three major subsectors.

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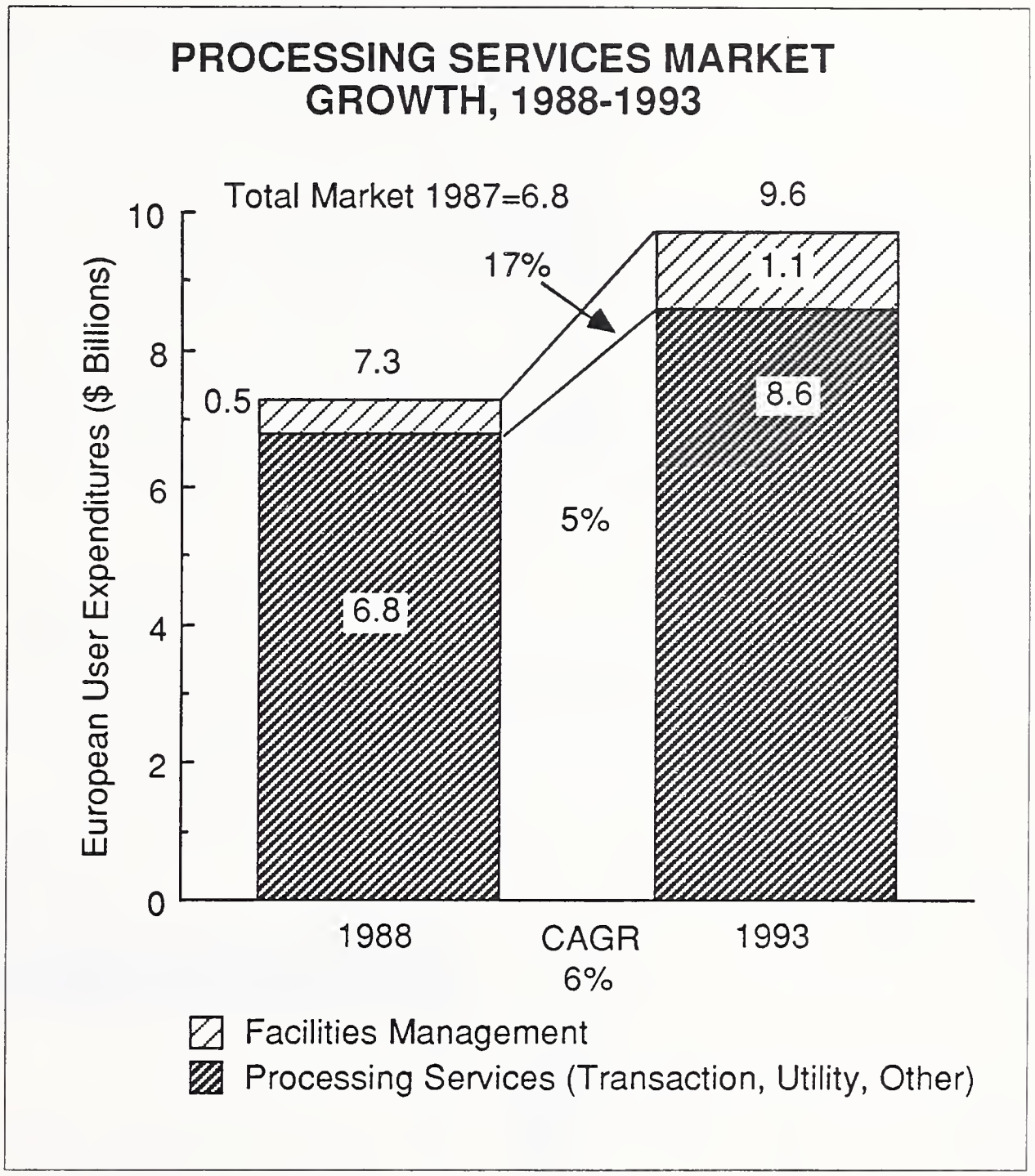
EXHIBIT II-5



- Managed network services
- Network applications
- Electronic information services

Managed network services consists principally of enhanced network services, generic services like protocol conversion, store and forward and packet switching. This area is specifically called VANS (value added network services) in the United States. In addition, the embryonic area of "network management" services is also included under this heading.

Network applications comprises the two major areas of electronic mail (E-mail) and EDI (electronic data interchange), together with any other application-specific services, for example some videotex type services.

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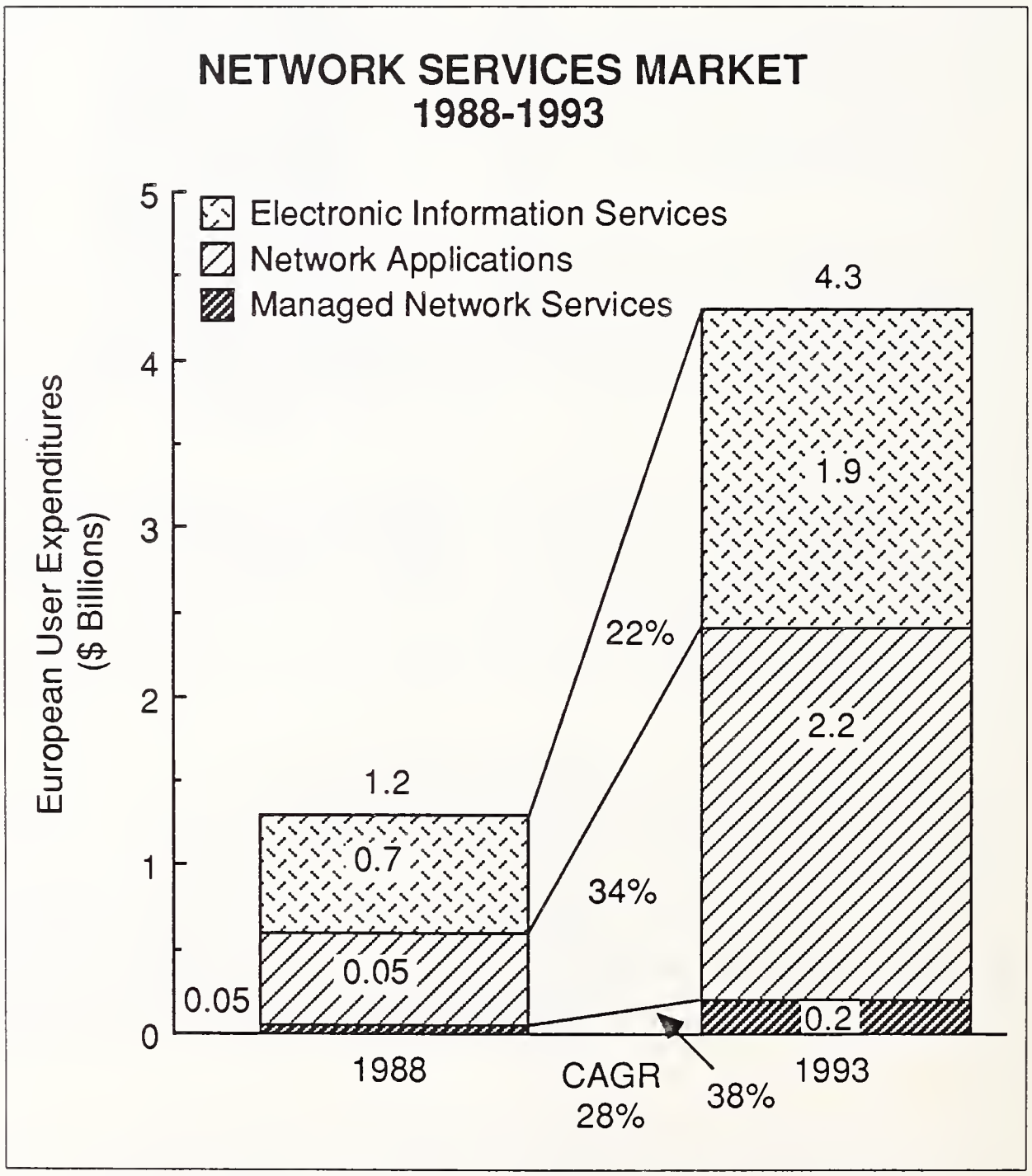
Electronic information services are those network-based services where the provision of information or data is the primary purpose of the transaction. This sector is sometimes referred to as on-line database services.

High growth in the network services market has been a feature of the past year. Many strategic alliances have taken place between vendors all over Europe, as companies seek to achieve better market positioning, particularly with the single European market initiative in mind.

Strong growth is expected to continue in this sector over the next five years. As depicted in Exhibit III-6, INPUT predicts a growth rate of around 34% for network applications over the forecast period, with electronic information services growing by about 22% per annum.

EXHIBIT II-6



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G

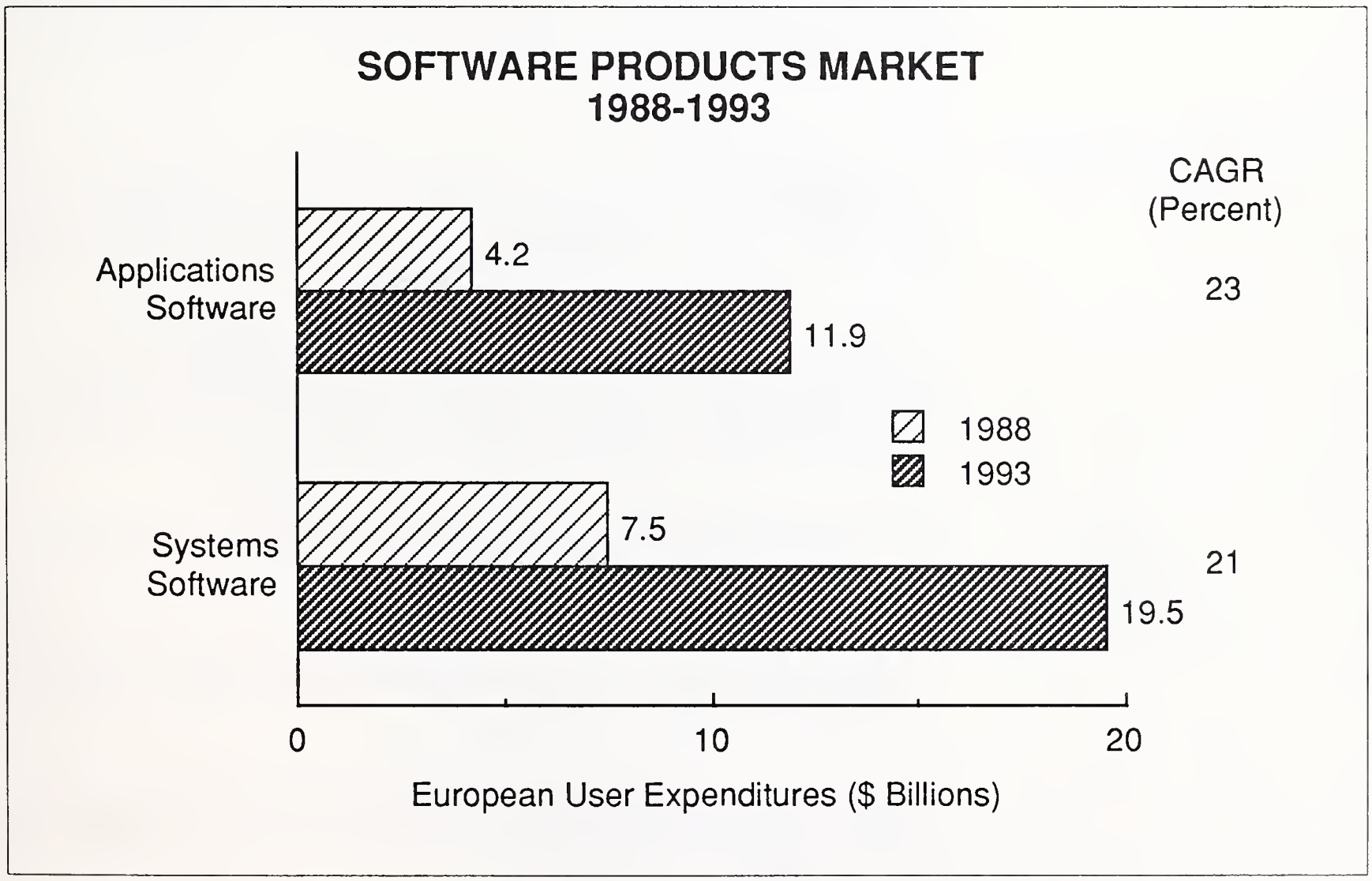
Software Products

The software products sector of the computer software and services business is expected to have the highest growth rate of any of the large sectors over the next five years, averaging 22% per annum.

This sector makes up an increasingly important proportion of the industry. In 1979, it represented around 10% of the industry total; by 1988 this had risen to 27%; INPUT predicts that software products will account for 31% of total industry revenues by 1993.

The systems software market is about twice as large as that for applications software. The expected growth rate for applications software, at 23% per annum for the next five years, is slightly higher than that for the systems sector. This is shown in Exhibit II-7.

EXHIBIT II-7



The hardware manufacturers dominate the software sector, claiming over 60% of the market. They are expected to maintain this strong position over the coming years, particularly in the applications software area. IBM, for example, has set up industry-specific divisions to provide

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applications solutions to customers, often in association with software product companies.

The growth in the software products sector is being driven by the increasing number of installed computer systems, as well as cost and timescale pressures on users. The applications sector in particular is increasing due to a shortage of skilled programmers in certain countries, which makes standard products more suitable than in-house development.

The sustained growth of the systems software sector is helped by the demand for more sophisticated control systems and database management systems.

There has been a general consolidation in the software products industry over the past year or two. Pressures on vendors to establish critical market position and size has led to many acquisitions. The world's biggest software product company, Computer Associates, increased its size further by acquiring ADR at the end of 1988. This followed its acquisition of Uccel in 1987.

H

Professional Services

The growth rate for the professional services sector is expected to average 20% per annum for the period 1988 to 1993. In this time the sector will increase from $12.8 billion to over $32 billion as shown in Exhibit II-8.

All of the subsegments of professional services which INPUT distinguishes are predicted to show good growth. The main component is custom software development which is expected to grow at around 20% per annum over the forecast period.

Key overall market forces driving demand for professional services include:

- The need to meet growing information systems demands in the face of a shortage of skilled in-house staff and in a more complex, rapidly changing technical environment

- The continuing growth in the installed base of information systems within user organisations and the importance of these systems to company performance and efficiency

On the supply side, the principal overall constraints on market growth include the ability of service organisations to recruit, retain, and motivate adequate levels of skilled staff. This is likely to become increasingly critical in the face of the demographic trend, with fewer young people becoming available on the job market.

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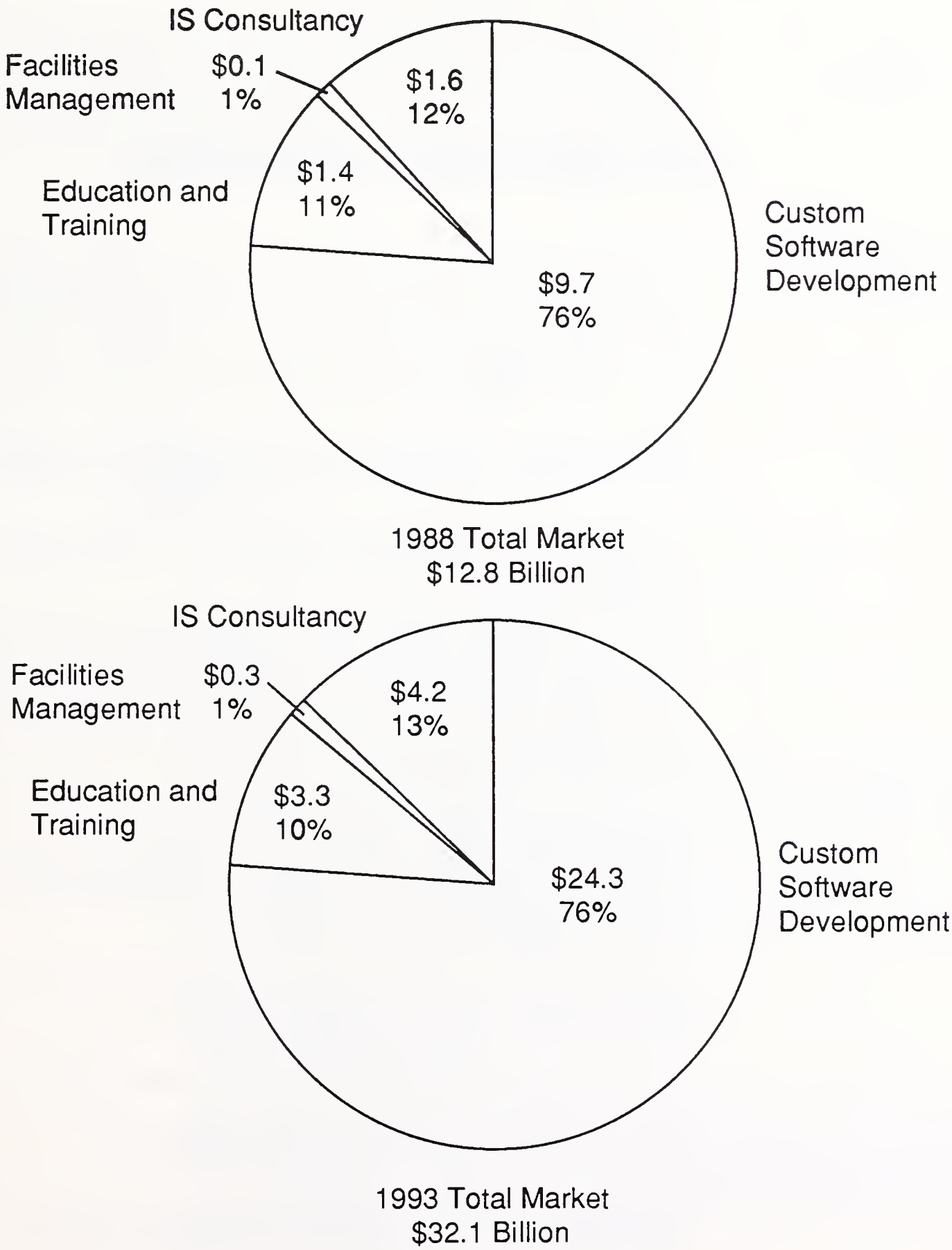
EXHIBIT II-8

PROFESSIONAL SERVICES MARKET, 1988-1993



Note: The custom software development forecast includes contract staff. The facilities management forecast only includes contracts for user-owned hardware

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The speed with which opportunities created by the use of software engineering tools and techniques can be exploited is also a potential inhibitor, although its impact is unlikely to be very great. The management skills to create systems are still going to be very much in demand.

The last few years have seen considerable merger and acquisition activity amongst European professional services companies. The merger of CAP and Sema Metra and the takeover of Scicon by Systems Designers are the most significant developments that have taken place, as vendors become aware of the need to achieve more market share and wider geographical coverage.

I

Systems Integration Opportunities

Systems integration has emerged within the computer industry as an important delivery mode, offering considerable growth opportunities into the foreseeable future. It is not a new phenomenon as such—it has been normal practice in the defense sector—but it has now achieved sufficient critical mass in the commercial arena to warrant separate identification.

INPUT defines systems integration as that set of contracts or business activity in which a third party vendor provides:

- 'An integrated solution to a multidisciplinary information systems requirement'

INPUT qualifies this definition by regarding only those contracts that exceed $1 million in total value to be sufficiently large to warrant inclusion. Critical to the systems integration approach, from both the client's and the vendor's perspective is the sharing or total transfer of responsibility (and risk) for the project.

The overall market for systems integration can be analysed into three broad constituent parts—commercial, central government and defense—as is indicated in Exhibit II-9. The largest and fastest growing opportunity lies in the commercial sector.

Systems integration projects include the provision of a number of different components; the principal subsectors are:

- The provision of computers and communications hardware
- Software products, both systems and applications
- Professional services, including principally consulting, project management, design and integration and software development
- Other miscellaneous products/services like processing or network services and supplies

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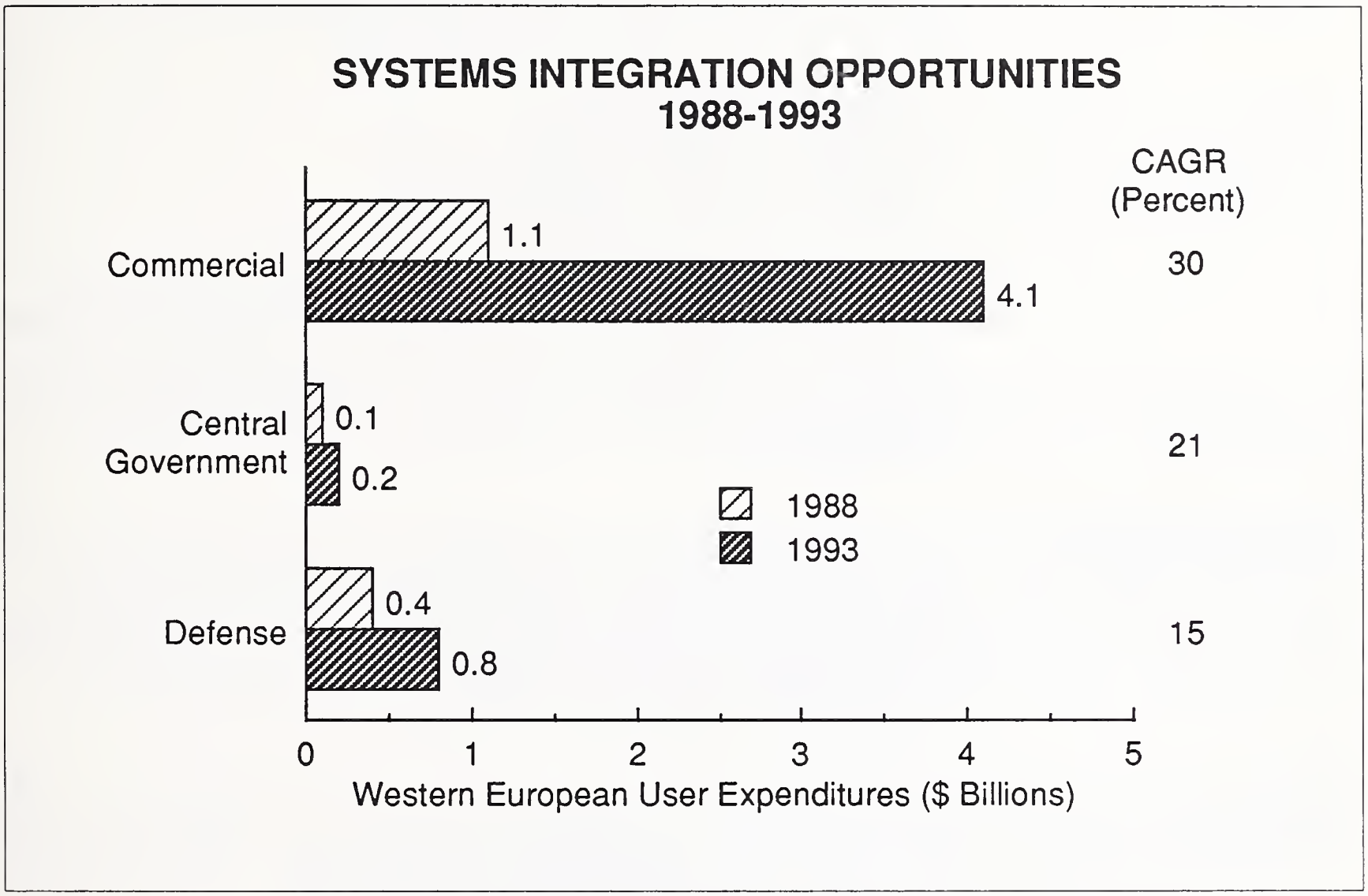
EXHIBIT II-9



The highest level of growth is likely to be experienced in the professional services sub-sector which is estimated by INPUT to account for some 55% of the market by 1993, in contrast to the 46% estimated for 1987.

The fundamental driving forces behind the growth of the systems integration sector can be classified under three headings:

- Technology
- Systems management
- Business commercial

As computer controlled systems become more comprehensive, reach out into new applications areas, and have more reliance placed upon them, their complexity demands special skills for their development and successful implementation. Systems integration vendors are developing their capabilities to meet that challenge.

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Systems integration vendors, by the nature of the technology integration challenge, come from a number of different backgrounds. In general, they can be classified into the following groups:

- Computer equipment vendors
- Professional services vendors
- Electronic engineering companies
- Telecommunications equipment vendors

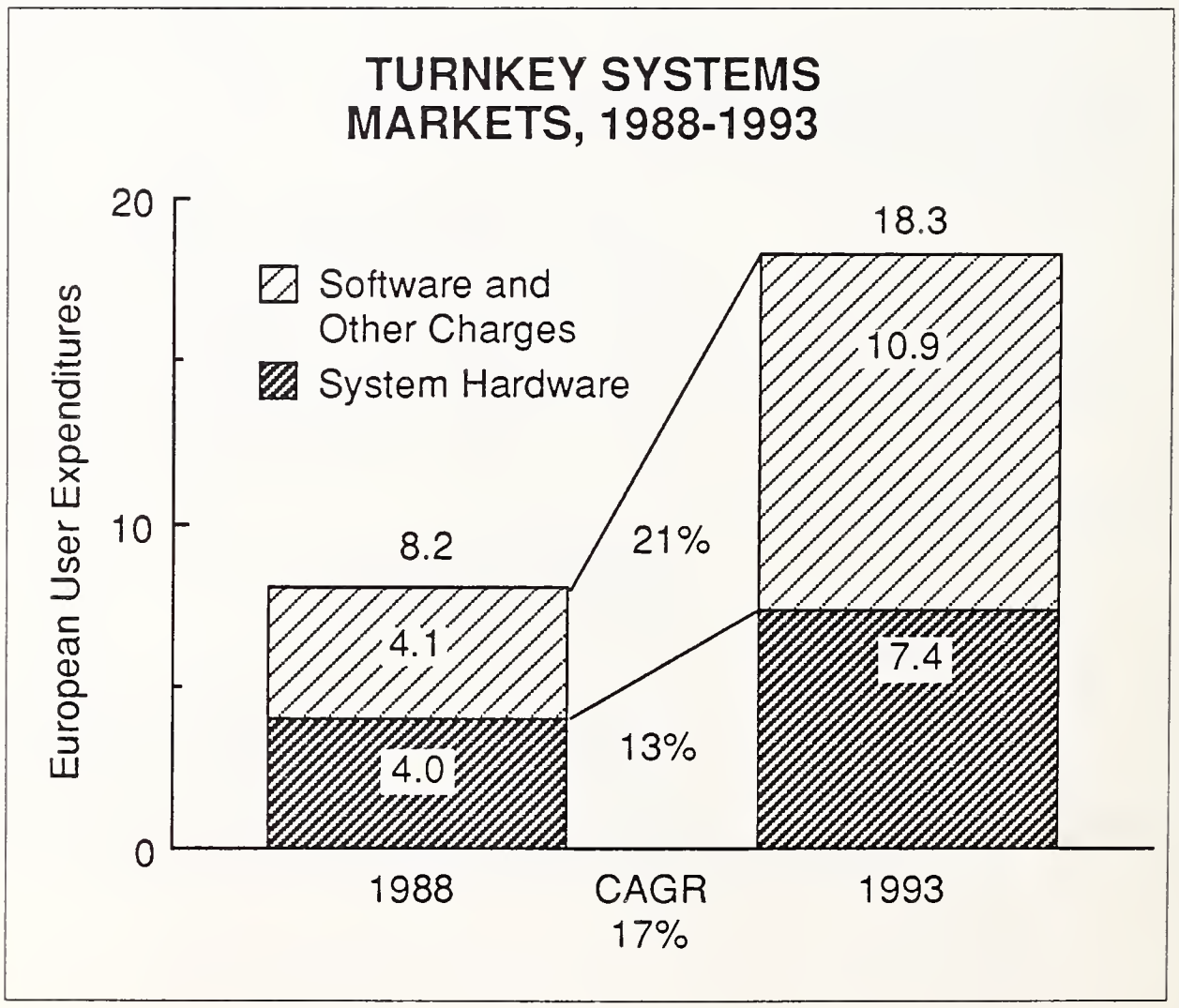
Whilst computer equipment vendors are strongly represented in this sector overall, professional services companies have developed a particularly strong showing in the commercial systems integration sub-sector. During 1988, Andersen Consulting acheived market leadership ahead of CGS/SESA, SD-Scicon, LOGICA, and the SEMA Group within this important sector.

J

Turnkey Systems

The market for turnkey systems (designated "integrated systems" or "standard turnkey systems" in previous INPUT reports) was valued at $8.2 billion in 1988. This sector is predicted to grow by 17% per annum for the period 1988 to 1993, to reach a total of over $18 billion (see Exhibit II-10).

EXHIBIT II-10



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The turnkey systems market encompasses three main areas—CAD/CAM, small- to medium-sized business systems, and specialist vertical or niche market systems. Vendors typically provide a combination of hardware, software, and services.

This total includes the system hardware as well as the software and other charges. The hardware share of the turnkey systems sector is expected to fall from around 50% in 1988 to 40% by 1993. This reflects the general decrease in hardware prices and the increasing proportion of value to be added to systems through the software systems.

Some of the significant factors driving the turnkey market are:

- The range and scope of turnkey systems employing powerful micro-computers or workstations that are now challenging the functionality of mainframes.

- The user need for complete hardware/software systems that provide a total solution. This need is strong when new equipment is involved or the system is being installed in a "non-computer" environment. When users are familiar with the technology involved and it basically utilises standard industry components (e.g. PCs), then there is a tendency to migrate away from this delivery mode.

K

Industry Market Opportunities

As computer software and services represent an increasing proportion of the user's expenditure on information systems, and as those systems become increasingly tightly bound with the user's applications, the need for detailed and comprehensive knowledge of target industries becomes a necessity for vendors. Exhibit II-11 shows in broad outline INPUT's assessment of the major industry market opportunities within the computer software and services market.

The two most significant broad sectors are manufacturing and banking and finance. The pressures for efficient manufacturing practice, just-in-time inventory systems and automated plant control and materials handling systems will continue to represent key opportunities for the software services industry. In the banking, finance and insurance area, continued application of information systems as the basis for providing new competitive services and integrating back-office environments will create important opportunities to maintain this sector as a very significant part of the market.

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III

Market Overview and Forecasts

III

Market Overview and Forecasts

A

The Computer Software and Services Market Environment

The computer software and services business continues to develop at a rapid pace. It continues to throw down fresh challenges to vendors in terms of new opportunities to be exploited and the management challenge of developing successful and profitable companies. Key environmental and strategic issues for the Western European computer software and services business in Western Europe, discussed below, are:

- Market development forces
- Market structure and rationalisation
- Key vendor challenges

1. Market Development Forces

The fundamental driving force of the computer software and services industry is the rapid development of the basic technology and the consequent continuous advance of its applications. Advances in the areas of data storage capacity, communications capability and, of course, in semiconductor technology create the opportunity to develop increasingly larger and more sophisticated software systems.

Relational data structures offer new possibilities for organising and accessing data. Open systems standards and multiplatform software regimes create opportunities to achieve far greater flexibility in the design of information systems. In particular the development of communications technology and its integration with high-powered low-cost computers has enabled information systems to become distributed within user organisations. This distribution has fundamentally altered the extent and nature of computer systems, making them not only much more complex to build and maintain, but at the same time more critical to an organisation's operations.

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The movement from batch-orientation to real-time and on-line modes, from the back to the front office and from standalone to interactive applications has fueled the demand for outside services. Not only must organisations implement new systems in order to maintain or improve their competitive position, but in most cases, they must still maintain their existing systems. The pressures on information systems management in terms of demand for staff, special expertise and software development schedules continue to open up opportunities for computer software and services vendors.

On a broader level, the general development of 'high technology' is causing fundamental changes to the business environment. Improved communications (e.g., by voice and fax), reliable and quick transportation systems and the speed with which information (in contradistinction from data) is disseminated, have contributed to increasing global competition and deregulation of the important markets of financial services and telecommunications.

These changing environmental conditions place pressure on business executives and administrators to maintain their organisations' competitiveness through 'bottom line' management and faster response to changing consumer patterns. Thus, organisations are increasingly marketing-oriented rather than production-oriented and are becoming more modular and flexible rather than rigid and hierarchical in their structure. The utilisation of computer systems is vital to the achievement of an efficient, cost-effective organisation. Users' increasing inability to economically service these specialised needs internally is the principal driving force of the computer software and services industry.

One of the principal hopes, often expressed in journals and magazines, is that sophisticated software development systems will solve the so-called 'software crisis' and reduce the apparent enormous backlog of applications development. The point must be made, however, that although the production of code can be automated and there are many different code generators, the integration of complete systems is the real challenge and has no apparent easily automated solution. It is the software and services industry, which is, in effect, master of the art of systems integration, that will grow and develop in response to the need for increasingly complex systems.

The only real apparent inhibitor to the continued rapid growth of the computer software and services industry is doubt over the future availability of skilled people. A demographic trend in most of the economically advanced countries shows a diminishing pool of young people; by the mid-1990s the pool will be around one-third smaller than today. It is likely that the computer industry will need to respond to this trend with strategies designed to increase the workforce from other sources. These responses are likely to include the acceptance and development of more

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women into the computer industry, the encouragement of new entry or retention of older workers and immigration. Telecommuting and part-time work are also likely to feature strongly.

A major implication of this trend will be increasing emphasis on education and training and human asset management. The training 'half-life', possibly now down to the 2-3 year level, is likely to continue shrinking and thus place a strong demand for retraining services.

2. Market Structure and Rationalisation

The structure of the computer software and services industry remains highly fragmented with many different types of vendors as active participants. INPUT estimates that in 1987 in this $36 billion industry there were only 40 vendors that achieved annual revenues in excess of $100 million and that there were a further 400 vendors with revenues exceeding $5 million. The vast majority of participants, an estimated further 12,500, had annual revenues under the $5 million level.

In terms of the types of industry participants, vendors can be broadly classified into the following major groups:

- Professional services vendors
- Software product vendors
- Processing services vendors
- Network services vendors
- Information organisations
- Equipment manufacturers
- Accountancy practices
- Turnkey suppliers

In many cases, large services companies are active in most, if not all, of the separate sectors that constitute the computer software and services industry. Thus, there exists considerable overlap and interaction between the diverse types of activity that together constitute the industry. This melange is constantly being affected by new technological advances and developments and their marketing and commercial responses. As a result of those factors and the fragmented industry structure, there exists a continuous process of rationalisation and consolidation.

It can thus be observed that the hitherto fairly clear distinctions between products and services are becoming blurred:

- Traditional product-oriented companies are adding services and becoming service-driven.

- Traditional service-oriented companies are adding products as the basis of service offerings.

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- New competitors from other industries, e.g., aerospace and banking, are emerging with services developed in the first instance to serve their own needs.

These changes are fundamentally driven by the increasing heterogeneity and complexity of advanced information systems already discussed. As vendors seek to meet these new integrated needs, the structure of the industry is affected. Equipment vendors must place emphasis on the supporting services, and services-oriented companies must seek to acquire product platforms, to remain competitive and penetrate new markets.

INPUT therefore expects a continuation of the rationalisation process already evident in the industry today. This has primarily been manifested in a high-level of merger and acquisition activity. INPUT has estimated that during 1987 there were some 70 merger and acquisition deals concluded in Western Europe and that the 1988 total is likely to have exceeded 100. The challenge of '1992', the timetable for the introduction of community-wide legislation designed to create a unified market in Western Europe, appears also to be an important factor in driving merger and acquisition activity. Some important examples of this rationalisation and consolidation process are listed in Exhibit III-1.

EXHIBIT III-1

MAIN MERGERS AND ACQUISITIONS IN EUROPE, 1987-1988

Company 1	1987 Revenues ($ Millions)	Company 2	1987 Revenues ($ Millions)
Systems Designers	130	Scicon	295
Sema Metra	236	CAP Group	172
Tietotehdas	108	Datema	82
Cap Gemini Sogeti	680	Data Logic	25
		SESA	192

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In March 1988, Systems Designers took over Scicon, the BP software subsidiary, in an £80 million deal. Scicon was the larger of the two companies and had significant revenues outside the U.K. (mainly in West Germany and France). The new company, SD-Scicon, will be a very significant player in the European market.

The French company Sema Metra merged with CAP Group of the U.K. around the same time to form the Sema Group. These two companies were leading players in their own countries and together form a major European force. In addition to having significant revenues in France and the U.K., the Sema Group also has sizeable subsidiaries in Spain, The Netherlands and Belgium.

In late 1987, Sweden's biggest software and services vendor, Datema, was bought by the leading Finnish company Tietotehdas. In 1987, Tietotehdas had revenues of about $108 million, with Datema earning around $82 million. The new company is easily the biggest Scandinavian software and services vendor, and one of the leading ones in Europe.

Europe's largest information services company, Cap Gemini Sogeti, acquired the Swedish company Data Logic early in 1988. This will result in Cap Gemini almost doubling its revenues in Sweden. It follows a number of other foreign purchases in 1987, the most important being Ibat (West Germany) and Ge-Da (Italy). In France, Cap Gemini Sogeti increased its holding in SESA from 42% to 93% in 1987.

3. Key Vendor Challenges

Some of the key trends manifesting themselves in the computer software and services industry, such as the blurring of segment boundaries and the evolution of the industry structure, have already been described or referred to. Additionally increasing internationalisation of business and the greater acceptance of standards will also have profound effects upon the industry.

Internationalisation, promoted by improvements in all types of communication, will mean the breakdown of existing market barriers. Whilst some trade protectionist measures may be taken, it is unlikely that they will affect the computer software and services business to any significant extent. A further dimension, already apparent, is the internationalisation of buyer requirements. International groupings and partnerships are a key motivation for merger and acquisition activity, particularly in Western Europe.

The greater acceptance of standards is also partly a result of this internationalisation; there is the desire to base systems and services on common platforms even if local needs exist at the user interface. Perhaps the most important driving force behind the more widespread adoption of stan-

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dards is the economics of production. The dominant role of software as a system component has had a dramatic impact on the research and development budget required to bring new systems products to market. The availability of standardised modules, both hardware and software components, that meet widely accepted industry standards, enables vendors to integrate them at a cost considerably lower than developing completely new systems. Further, the desire on the part of users to participate in a widely accepted 'standard', to an extent protecting their investment, represents the fundamental pulling force in the industry. From the user perspective, choosing a 'standard' implies the selection, in any particular area (e.g., a relational data base system), of what is perceived to be one of the leading products. Fringe products have a very difficult challenge to overcome in terms of gaining market acceptance. They have to demonstrate overriding technical advantages in order to overcome the natural user resistance to being condemned to a technical backwater.

The continuously changing environment for computer software and services thus presents particular challenges to vendors. To meet these challenges, vendors will need to pay increasing attention to a number of significant areas:

- Delivery modes
- Know-how
- Management skills
- Management organisation
- Human asset management

Maintaining and developing client contacts or establishing appropriate distribution and support mechanisms for commodity-oriented products are major challenges. Vendors must seek to place increasing emphasis on these areas in order to track a continuously changing user environment.

The attraction, retention and development of 'know-how' is clearly fundamental to future success—know-how not just in terms of both technical skills and management. Vendors will increasingly need to develop not only technical knowledge of the target and computer industries, but management skills to design, develop and implement systems to a high level of quality as well. This quality must come not only in technical terms, but also in the form of achieved delivery dates and budgets.

This implies developing superior management skills that will enable a vendor to profitably handle the complexity of the 'integrated' system services of the future. Thus, skills must not only exist at the individual level but must be manifested at the team, department, division and company level.

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This in turn implies that organisations are likely to become federated, more loosely knit and certainly less hierarchical. Rigidity must be replaced by flexibility in order for the vendor to be adaptive to changing and developing client needs and wants.

Vendors must develop all these skill levels and are likely to have to invest far more time and money into human asset management than has hitherto been the case. With the half-life of expertise falling, vendors will need to respond with education and training programmes designed to maintain and develop their stock of know-how and management techniques. It needs to be understood that people are the most important economic asset. Education and training and technical and scientific knowledge are more important than any other assets or resources.

In summary, it can be proposed that vendors will need to place increasing emphasis on professional services and that they will need to develop or acquire the necessary technological and implementation expertise. Success will come to those vendors willing and able to take responsibility for and control of the advanced and complex systems of the future.

B

Market Forecasts for Computer Software and Services, 1988-1993

The forecast data provided in this report is based on research conducted during 1988. Previous INPUT research was also considered. Market development for the 1987-1988 period was evaluated from in-depth face-to-face, mail, and telephone interviews with senior executives in user and vendor organisations. The analysis was supported by other public domain information.

The processing services sector was forecast for two constituent modes:

- Transaction, utility and other services
- Processing facilities management (FM) or operations management

Software products were forecast:

- By systems and applications packages
- For independent suppliers and equipment vendors

Professional services were forecast for the following categories:

- IS consultancy
- Custom software development (including contract staff)
- Education and training
- Professional services facilities management (operations management)

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Turnkey systems were forecast by:

- Hardware revenues
- Software and other charges

Network services forecasts were divided into the following categories:

- Managed network services
- Network applications
- Electronic information services

Systems integration at the European level was broken down into:

- System hardware
- Professional services
- Software products
- Other services

The forecasts cover the period 1988-1993 (including 1987 actuals) and assess end-user expenditures. Forecasts are made in local currency and converted into U.S. dollars for aggregation and comparative purposes.

Owing to the unpredictability of international exchange rates, the U.S. dollar conversion rates used for all the forecasts have been taken as the average rate for 1988. These are listed in Exhibit III-2.

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EXHIBIT III-2

U.S. DOLLAR EXCHANGE RATES, 1988

COUNTRY	CURRENCY	DOLLAR EXCHANGE RATE
France	FF	6.13
West Germany	DM	1.82
United Kingdom	£	0.59
Italy	Lira	1,351.60
Netherlands	Dfl	2.05
Belgium	BF	38.10
Sweden	SK	6.29
Denmark	DK	6.91
Norway	NK	6.66
Finland	FM	4.34
Switzerland	SF	1.51
Austria	Sch	12.81
Ireland	IR£	0.68
Spain	Pta	121.40

Source: Swiss Bank (1 July 1988 rates)

In addition, the forecasts have been expressed in actual monetary terms. For the benefit of the reader, the average 1987 inflation rates for all European countries have been included in Exhibit III-3, together with estimates for 1988 and forecasts for 1989 and for the period 1989 to 1993. Exhibits III-4 and III-5 provide background economic data on Western European countries.

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EXHIBIT III-3

INFLATION RATE FORECASTS

Country	Consumer Prices (Percent)			
	1987	1988	1989	1989-1993
Austria	1.4	2.0	3.0	3.4
Belgium	1.6	1.2	2.5	3.6
Denmark	4.0	5.0	5.0	5.8
Finland	3.7	5.5	5.0	5.8
France	3.3	2.8	3.5	4.3
Germany	0.4	1.2	2.0	2.4
Greece	16.4	14.0	13.0	13.0
Ireland	3.2	2.5	3.5	4.7
Italy	4.7	5.0	6.0	6.4
Netherlands	-0.5	0.8	2.0	3.4
Norway	8.7	7.5	6.7	6.8
Portugal	9.4	8.5	6.5	8.0
Spain	5.3	4.5	4.0	4.0
Sweden	4.2	6.0	6.0	6.8
Switzerland	1.4	2.0	2.3	2.4
United Kingdom	4.1	4.7	5.3	5.1
EEC	3.1	3.3	4.0	4.4
Western Europe	3.1	3.4	4.0	4.5

Source: National Westminster Bank, September 1988

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EXHIBIT III-4

WESTERN EUROPEAN COUNTRIES— ECONOMIC DATA

Country	Population (Million)	Population Growth (Percent P.A. 1977-1987)	GDP ($ Billions)	GDP per Capita (Dollars)	1987 Percent GDP Distribution		
					Agr.	Ind.	Serv.
Austria	7.6	0.1	122	16,600	5	43	52
Belgium	9.9	0.0	144	14,555	2	33	65
Denmark	5.1	0.1	105	20,605	5	24	71
Finland	4.9	0.4	92	18,680	6	35	59
France	55.6	0.5	903	16,245	4	38	58
Germany	61.1	0.0	1,158	18,945	2	42	56
Greece	10.0	0.7	49	4,915	14	30	56
Ireland	3.6	0.9	31	8,475	11	25	64
Italy	57.3	0.3	775	13,515	4	34	62
Netherlands	14.7	0.5	222	15,105	4	34	62
Norway	4.2	0.3	86	20,580	4	43	53
Portugal	10.2	0.5	37	3,655	9	40	51
Spain	38.7	0.7	297	7,665	7	35	58
Sweden	8.4	0.2	164	19,575	4	36	60
Switzerland	6.6	0.4	176	27,705	NA	NA	NA
United Kingdom	56.8	0.1	683	12,025	2	36	62
EEC	323.4	0.3	4,410	13,635	-	-	-

Source: National Westminster Bank, September 1988

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EXHIBIT III-5

GNP GROWTH FORECASTS

Country	GNP Growth (Percent)			
	1987	1988	1989	1989-1993
Austria	1.3	1.5	1.5	2.0
Belgium	1.8	1.7	1.2	1.8
Denmark	-0.9	0.0	0.5	1.7
Finland	3.6	2.8	2.2	2.4
France	2.2	2.6	2.1	2.2
Germany	1.7	2.8	2.4	2.2
Greece	-0.5	1.5	1.5	2.5
Ireland	2.0	0.0	1.0	2.0
Italy	3.1	2.3	2.1	2.4
Netherlands	2.5	1.5	1.2	1.8
Norway	1.6	0.5	1.2	1.8
Portugal	5.1	4.0	3.5	3.5
Spain	5.2	4.2	3.5	3.0
Sweden	2.8	2.0	1.5	1.9
Switzerland	2.5	1.8	1.5	1.7
United Kingdom	4.2	3.5	2.3	2.7
EEC	2.7	2.7	2.2	2.4
Western Europe	2.6	2.6	2.1	2.3

Source: National Westminster Bank, September 1988

Exhibit III-6 shows that INPUT forecasts that the Western European software and services market will grow from a base of $36 billion in 1987 to $43 billion in 1988, representing a growth rate of 20%. The five-year projection shows the market increasing from $43 billion in 1988 to $101 billion by 1993 at a CAGR (compound annual growth rate) of 19%.

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EXHIBIT III-6

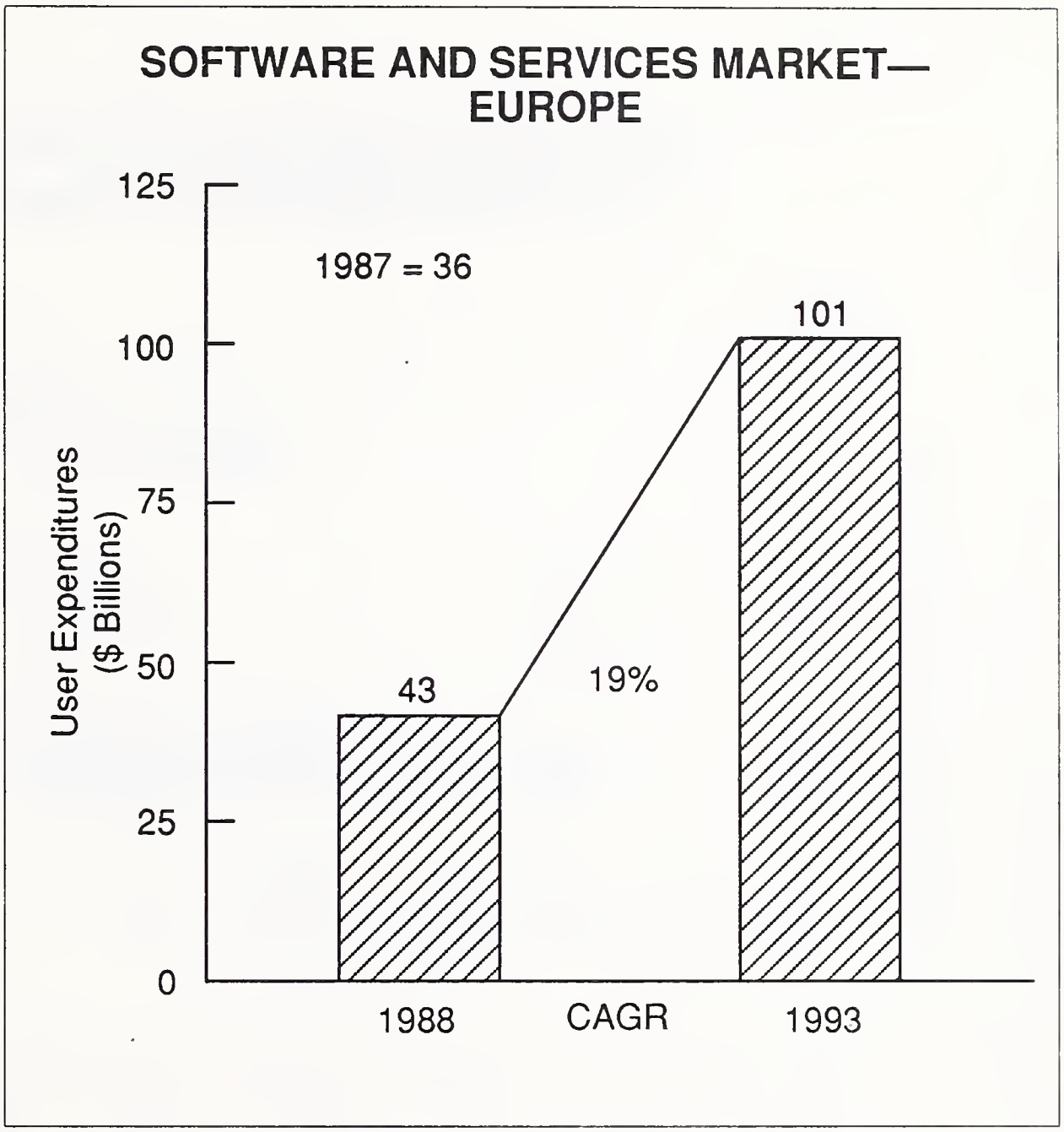

Exhibit III-7 illustrates the historic trend in revenue growth for the European computer software and services industry. Real annual growth (with a constant dollar exchange rate) was 20% for the period 1986 to 1987 and 21% for 1985 to 1986.

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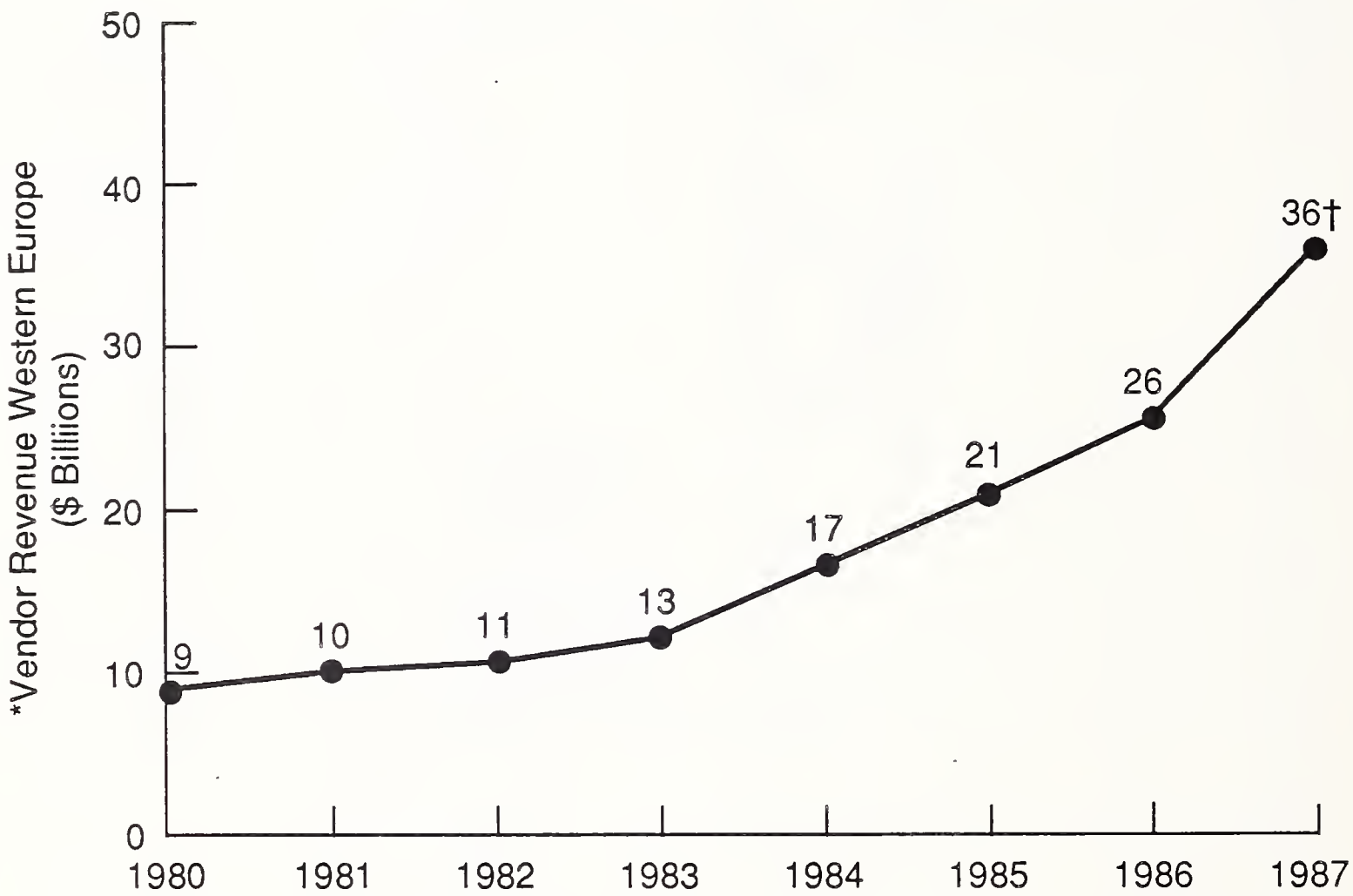
EXHIBIT III-7

REVENUE GROWTH IN THE SOFTWARE AND SERVICES INDUSTRY, 1980-1987



*Note: Definition changes have slightly affected gross market sizes on a year-to-year basis.

†Note: A significant change in the value of the dollar between 1986 and 1987 affects the growth rate shown above. Real growth for this period was approximately 20%.

Market development for the six major sectors is illustrated in Exhibits III-8, III-9 and III-10. Processing services is showing the slowest rate of growth at a CAGR of 6%. INPUT estimates that the share of this sector of the total market will fall from 17% in 1988 to 10% by the end of the forecast period.

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EXHIBIT III-8

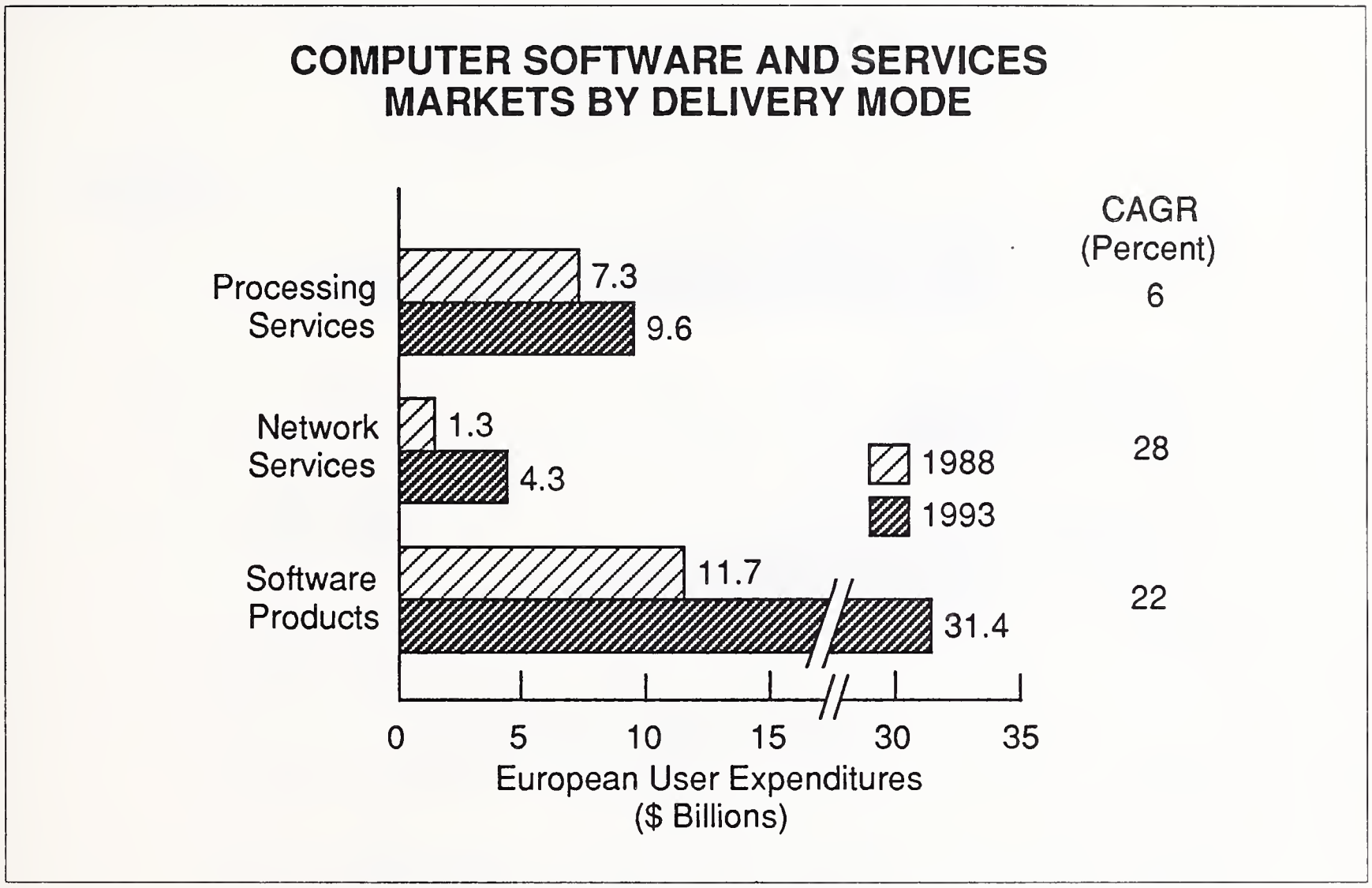

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EXHIBIT III-9

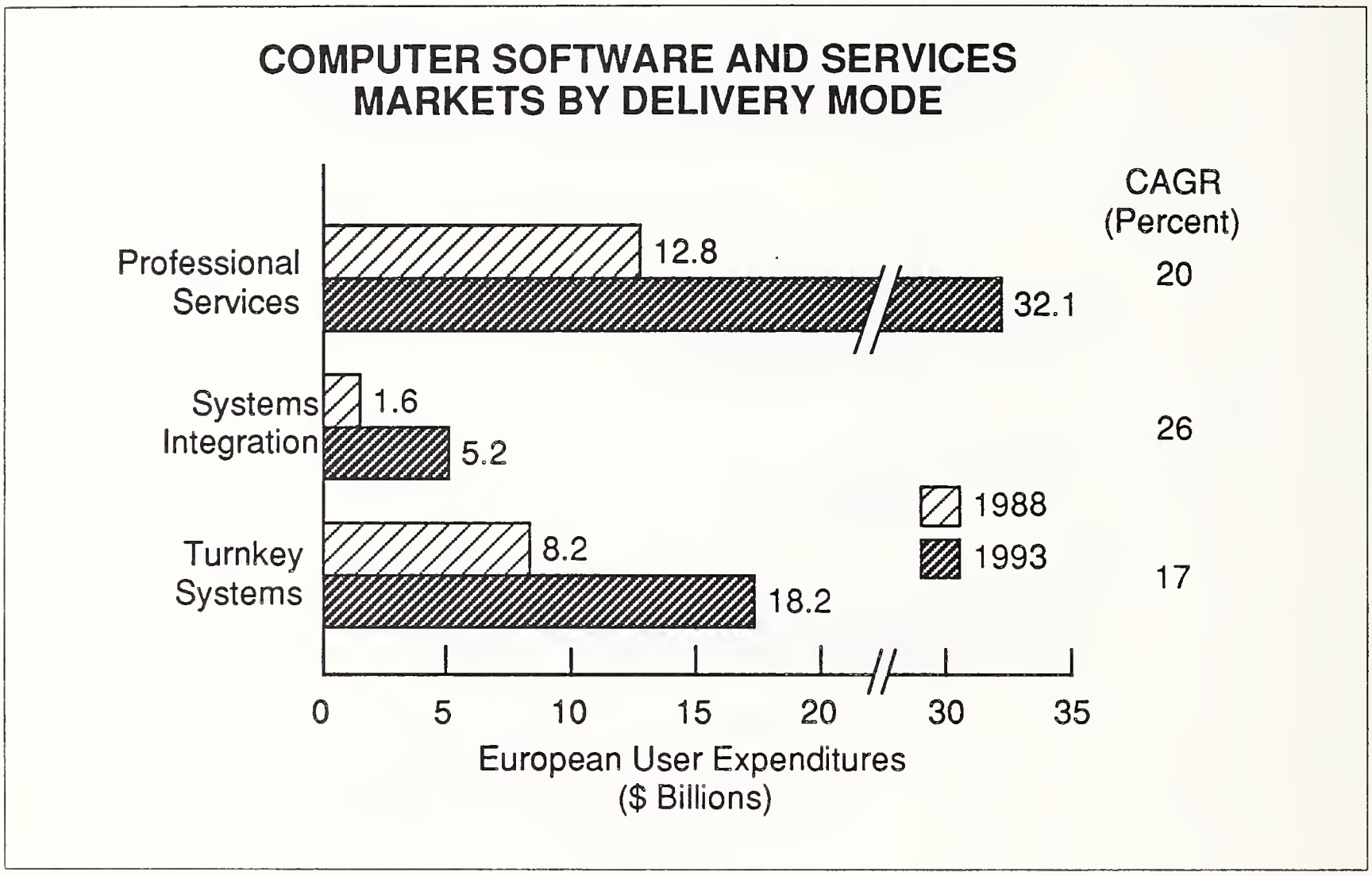

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EXHIBIT III-10

COMPARISON OF COMPUTER SOFTWARE AND SERVICES BY DELIVERY MODE IN WESTERN EUROPE, 1988-1993

Subsector	Market Forecast ($ Millions)			
	1987	1988	1988-1993 CAGR (Percent)	1993
Processing Services	6,810	7,310	6	9,640
Network Services	890	1,240	28	4,280
Software Products	9,420	11,710	22	31,360
Professional Services	10,450	12,810	20	32,090
Systems Integration	1,270	1,610	26	5,170
Turnkey Systems	6,860	8,180	17	18,230
Total	35,700	42,860	19	100,770

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INPUT expects the software products sector to remain buoyant throughout the period in both systems and applications software. This sector will increase its share of the total market from 27% in 1988 to 31% by 1993. This reflects the increasing trend towards standardisation in the industry.

Strong growth of 20% is forecast for the professional services sector. This sector will increase its market share from 30% in 1988 to 32% by 1993.

INPUT anticipates modest growth in the turnkey sector. This sector will slightly lose market share from 19% in 1988 to 18% by 1993. This decrease is influenced by the decline in hardware prices which is taking place.

The two smallest sectors, network services and systems integration, are both growing rapidly. This strong growth is expected to continue for the five-year forecast period.

Exhibits III-11, III-12 and III-13 illustrate INPUT's forecasts of the Western European market analysed by country market. Growth rates for the period 1988 to 1993 have been expressed in terms of actual growth in current dollars. Detailed analysis of each country market is provided in Chapter V of this report.

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EXHIBIT III-11

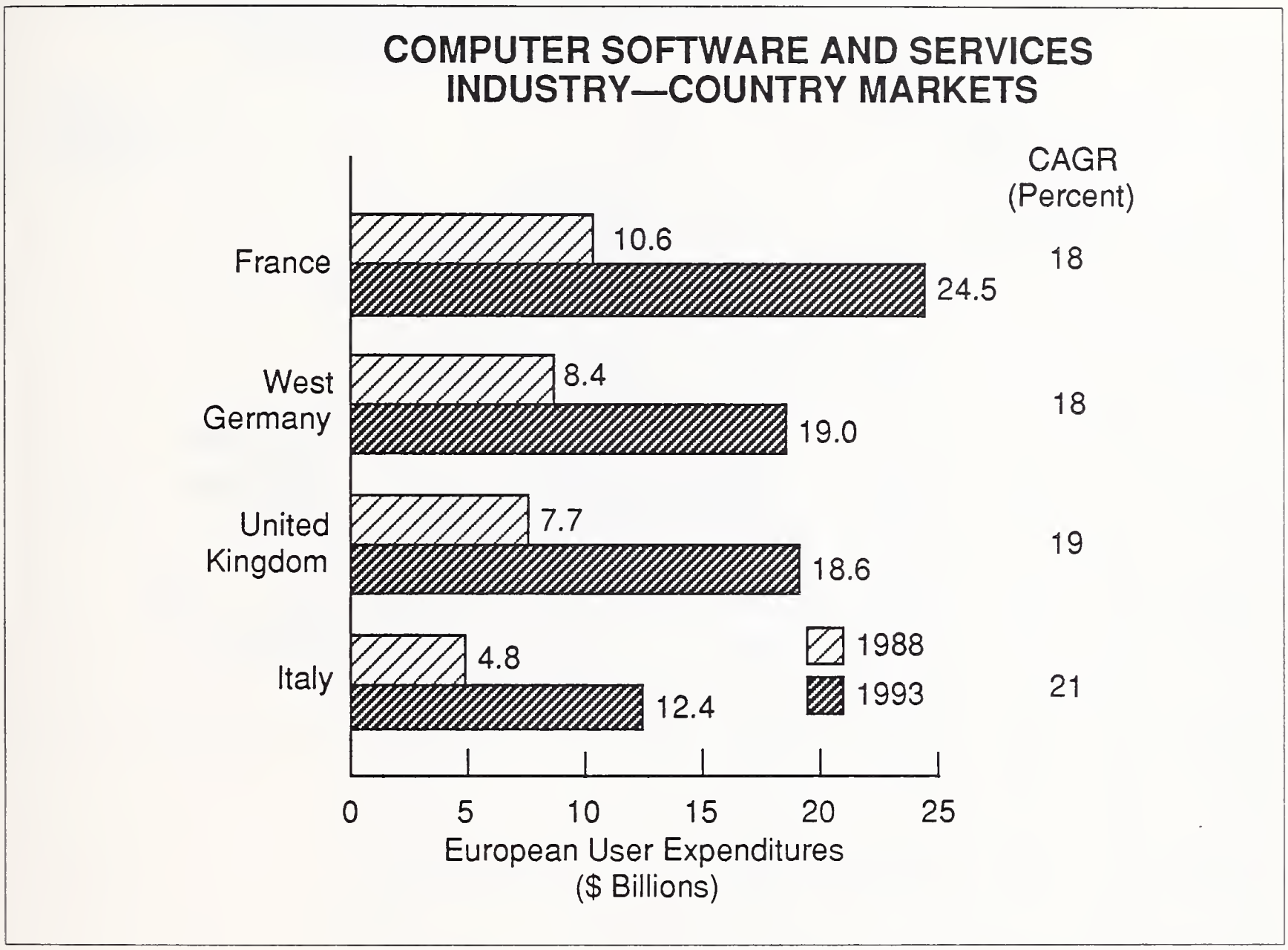

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EXHIBIT III-12

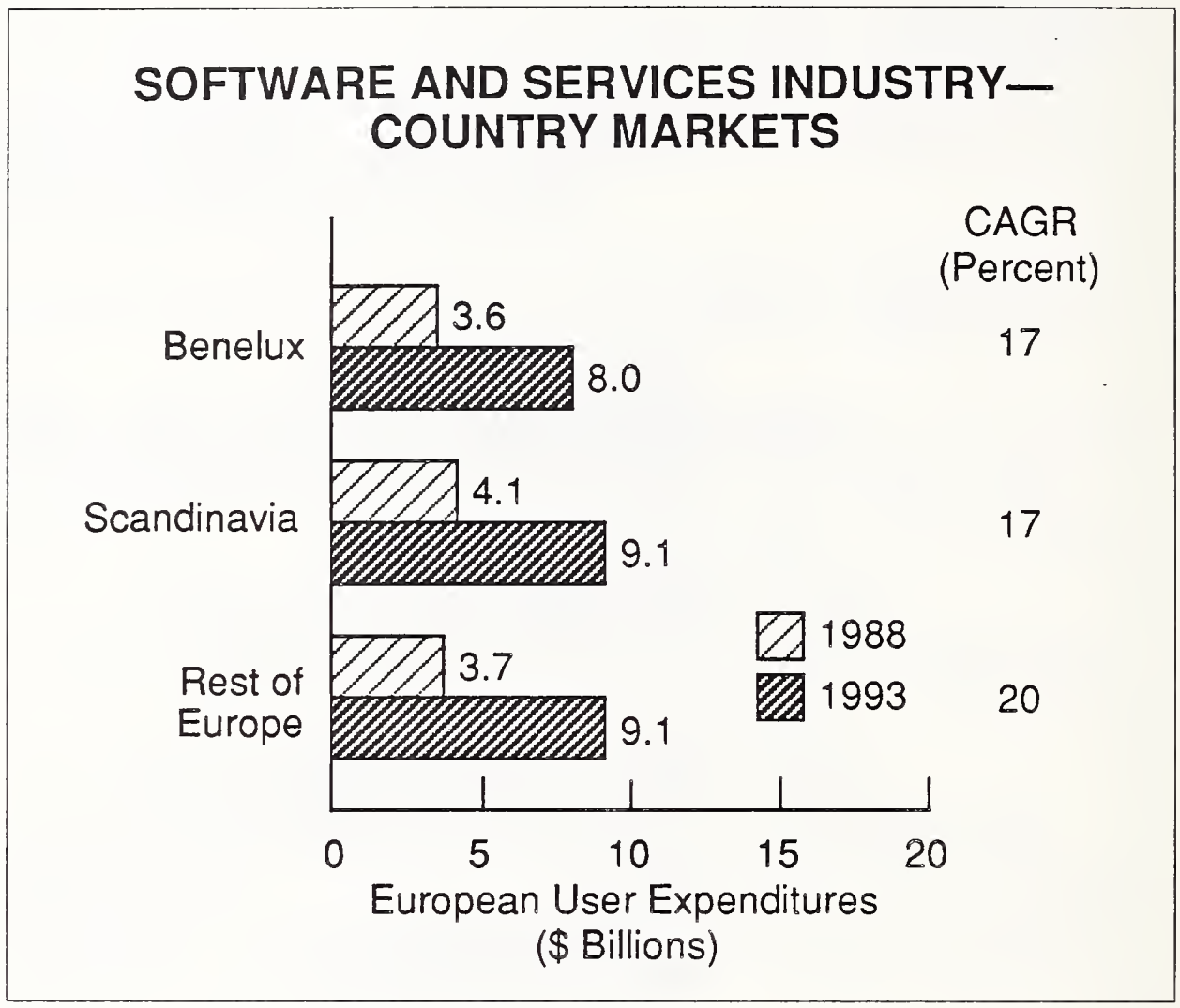

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EXHIBIT III-13

COMPUTER SOFTWARE AND SERVICES COMPARATIVE COUNTRY MARKETS

Country	Market Forecast ($ Millions)			
	1987	1988	1988-1993 CAGR (Percent)	1993
France	8,890	10,600	18	24,500
West Germany	7,040	8,400	18	19,050
United Kingdom	6,330	7,650	19	18,610
Italy	3,960	4,840	21	12,360
Sweden	1,210	1,440	18	3,220
Denmark	890	1,060	18	2,380
Norway	720	840	16	1,760
Finland	650	780	18	1,775
Netherlands	1,910	2,290	17	5,080
Belgium	1,060	1,280	18	2,915
Spain	930	1,140	23	3,220
Switzerland	1,210	1,450	18	3,270
Austria	580	690	18	1,580
Rest of Europe	320	400	21	1,040
Total (rounded)	35,700	42,860	19	100,770

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Exhibit III-14 illustrates the comparative size of the country markets in terms of the percentage of GDP (Gross Domestic Product) that is attributable to the computer software and services industry.

EXHIBIT III-14

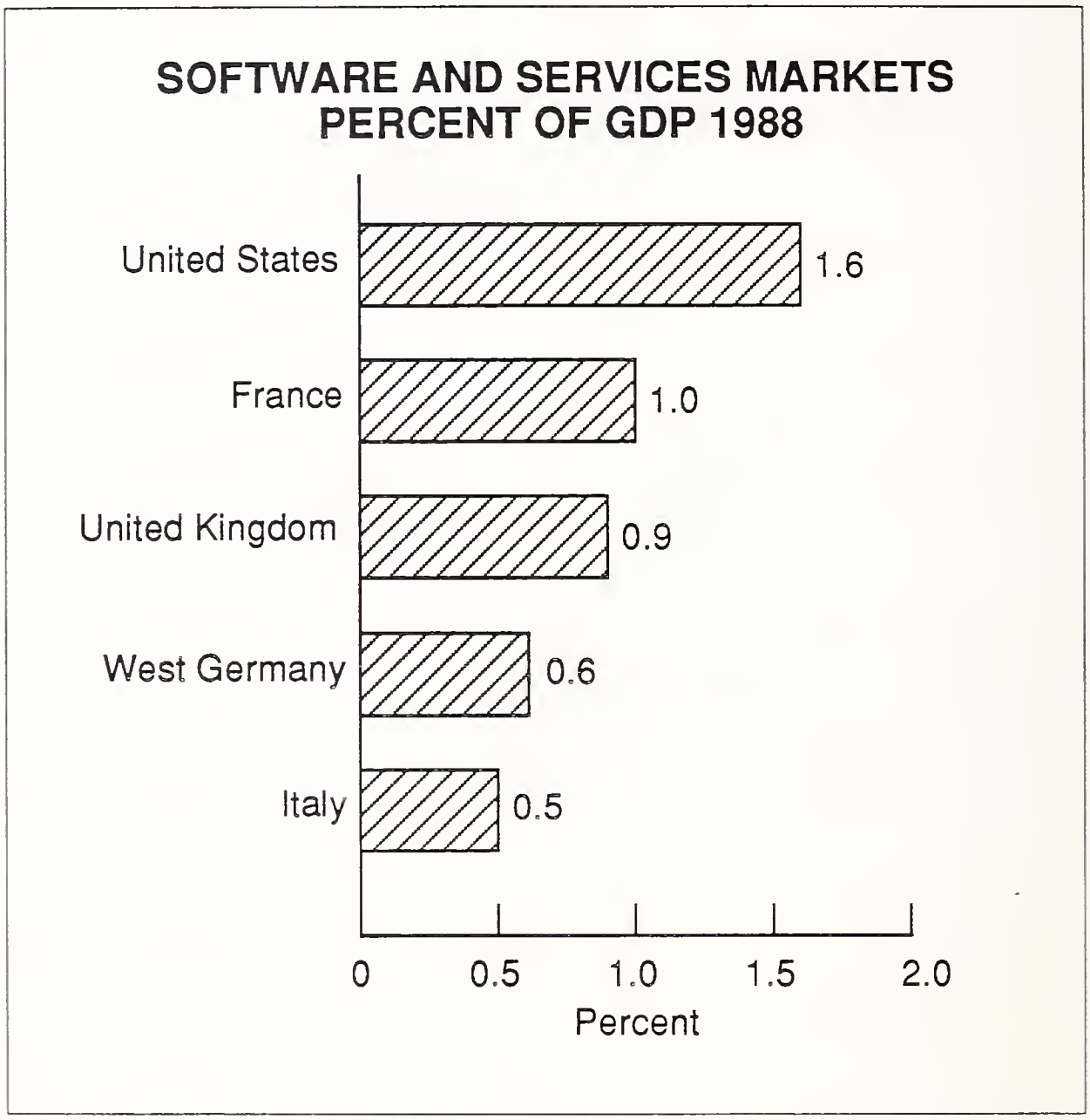

Exhibit III-15 illustrates INPUT's analysis of the European computer software and services market by major industry sector. The two largest sectors are banking and finance and discrete manufacturing.

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EXHIBIT III-15

COMPUTER SOFTWARE AND SERVICES INDUSTRY MARKET ANALYSIS— TOTAL WESTERN EUROPE, 1988

Industry Sector	Market Size ($ Millions)	Percent of Total
Manufacturing		
- Discrete	9,000	21.0
- Process	3,640	8.5
Distribution (Retail & Wholesale)	3,650	8.5
Transportation	1,800	4.2
Utilities	1,700	4.0
Banking and Finance	9,100	21.2
Insurance	3,350	7.8
Government		
- National	2,800	6.6
- Local	3,050	7.1
Services	3,300	7.7
Other	1,470	3.4
Total	42,860	100

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C

The Competitive Environment

Exhibit III-16 illustrates the worldwide revenues of the ten leading European-based software and services vendors.

EXHIBIT III-16

WORLDWIDE REVENUES, 1987 EUROPEAN-BASED INDEPENDENT PLAYERS—TOP 10

Rank	Vendor	Estimated Revenues ($ Millions)
1	Cap Gemini Sogeti	680
2	SD-Scicon	427
3	Sema Group	408
4	Finsiel	407
5	Sligos	228
6	GSI	225
7	Datev	200
8	CISI	188
9	Thorn Software	186
10	Logica	185

Note: SD-Scicon and Sema Group were formed following mergers in early 1988. The above figures are the sums of the 1987 revenues of the companies making up these groups.

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An important feature of the competitive environment is the increasingly important role being played by the hardware manufacturers in the software and services industry. All the major manufacturers obtained a higher proportion of their revenues from software and services in 1987 than in 1986. In the case of IBM, for example, the share increased from under 12% to about 15%.

Exhibit III-17 illustrates INPUT's top thirty vendor rankings and market shares for Europe. The table includes hardware manufacturers as well as the independents and shows IBM with a very clear lead over its competitors. Hardware manufacturers occupy six of the top ten positions in the table.

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EXHIBIT III-17

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
WESTERN EUROPE
COMPUTER SOFTWARE AND SERVICES
ALL VENDORS

Rank	Company	Market Share (Percent)	Estimated Revenues ($ Millions)
1	IBM	8.3	2,950
2	Nixdorf	3.0	1055
3	Unisys	2.0	725
4	Cap Gemini Sogeti	1.5	525
5	Siemens	1.5	520
6	Digital	1.3	475
7	Finsiel	1.2	415
8	Reuters	1.1	400
9	Transpac	1.0	355
10	Olivetti	0.9	330
11	Bull	0.7	250
12	Datev	0.7	245
13	Sligos	0.6	225
14	GSI	0.6	210
15	McDonnell Douglas	0.6	200
15	Scicon	0.6	200
15	Volmac	0.6	200
18	Sema Metra	0.5	195
19	CISI	0.5	190
20	Andersen Consulting	0.5	180
20	Computervision	0.5	180
22	Computer Associates	0.5	170
22	ICL	0.5	170
23	Telesystemes	0.4	155
23	Thorn Software	0.4	155
26	Microsoft	0.4	150
27	Logica	0.4	145
28	CCMC	0.4	140
29	CAP Group	0.4	135
29	Intergraph	0.4	135
	Others	68.0	24,320
	Total Market	100.0	35,700

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Exhibit III-18 illustrates the top thirty vendor rankings and shares excluding the hardware manufacturers, except for IBM's discrete processing and network services activity, INS. Cap Gemini Sogeti heads the table. Its revenues are spread throughout its many European subsidiaries. Finsiel, which occupies second position, earns practically all of its revenues in Italy.

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EXHIBIT III-18

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
WESTERN EUROPE
COMPUTER SOFTWARE AND SERVICES
INDEPENDENT VENDORS

Rank	Company	Market Share (Percent)	Estimated Revenues ($ Millions)
1	Cap Gemini Sogeti	1.5	525
2	Finsiel	1.2	415
3	Reuters	1.1	400
4	Transpac	1.0	355
5	Datev	0.7	245
6	Sligos	0.6	225
7	GSI	0.6	210
8	Scicon	0.6	200
9	Volmac	0.6	200
10	Sema Metra	0.5	195
11	CISI	0.5	190
12	Andersen Consulting	0.5	180
13	Computervision	0.5	180
14	Computer Associates	0.5	170
15	Telesystemes	0.4	155
16	Thorn Software	0.4	155
17	GEISCO	0.4	150
18	Microsoft	0.4	150
19	Logica	0.4	146
20	CCMC	0.4	140
21	CAP Group	0.4	136
22	Intergraph	0.4	135
23	Hoskyns	0.4	130
24	Steria	0.3	120
25	Istel	0.3	118
26	SG2	0.3	118
27	Tietotehdas	0.3	108
28	Fiducia	0.3	100
29	CMG	0.3	100
30	Programator	0.3	100
	Others	83.1	29,680
	Total Market	100.0	35,700

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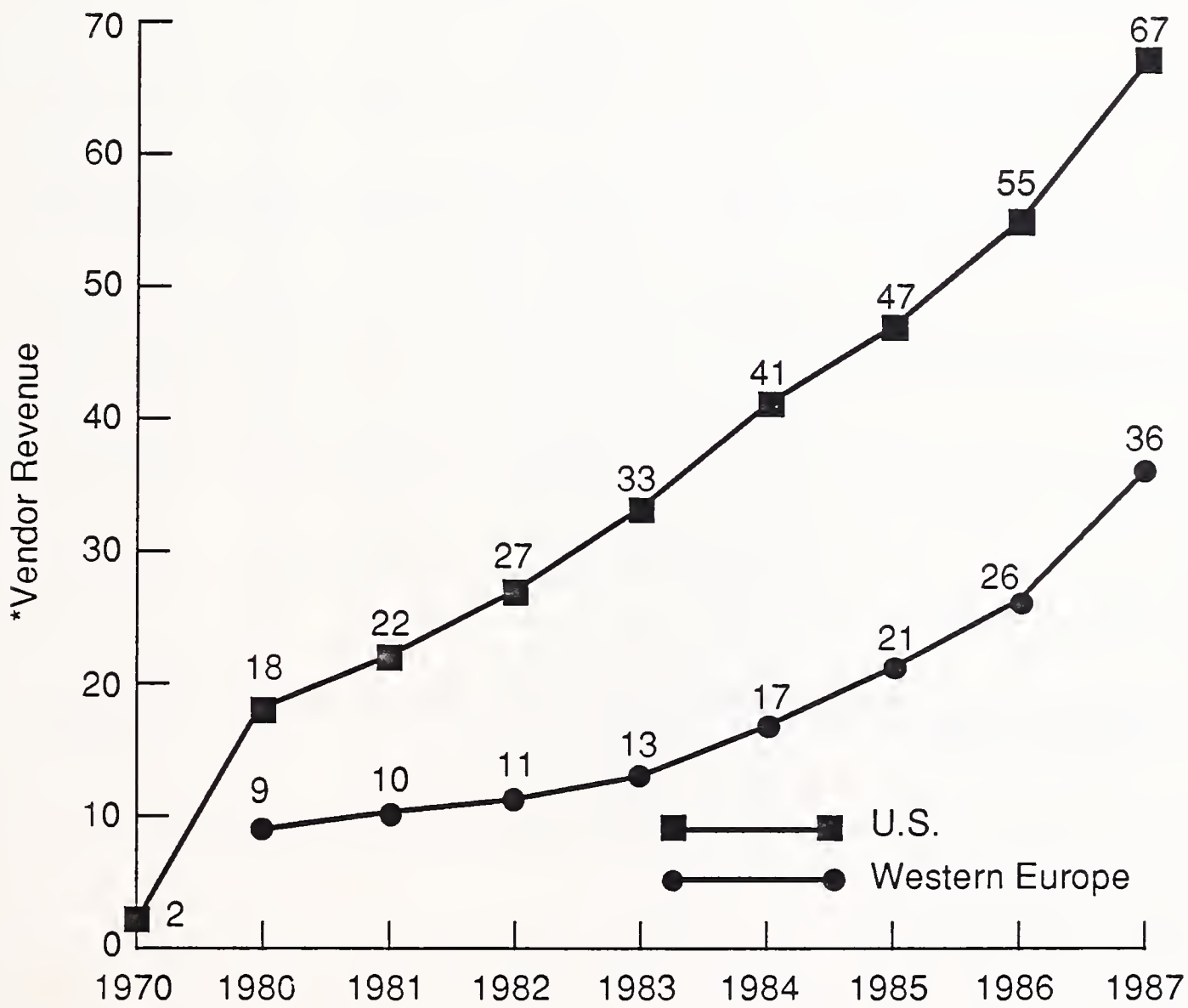
D

Comparison with the United States Market

Exhibits III-19 and III-20 illustrate comparisons between the U.S. market and the European market both in terms of a historical trend and as forecast growth. Exhibit III-20 also illustrates the comparison between the U.S. and Europe by market sector.

EXHIBIT III-19



*Note: Definition changes and dollar exchange rate differences (notably between 1986 and 1987) have slightly affected gross market sizes on a year-to-year basis.

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EXHIBIT III-20

COMPARISON OF U.S. AND WESTERN EUROPEAN SOFTWARE AND SERVICES MARKET DEVELOPMENT, 1987-1993

Subsector		Market Forecast ($ Billions) 1987	1988	1988-1993 CAGR (Percent)	1993
Processing Services	U.S.	16.5	18.9	12	32.8
	W.E.	6.8	7.3	6	9.6
Network Services	U.S.	5.4	6.2	23	17.2
	W.E.	0.9	1.3	28	4.3
Software Products	U.S.	19.9	25.1	20	61.1
	W.E.	9.4	11.7	22	31.4
Professional Services	U.S.	12.7	15.1	17	33.2
	W.E.	10.5	12.8	20	32.1
Systems Integration	U.S.	3.4	4.8	25	14.7
	W.E.	1.3	1.6	26	5.2
Turnkey Systems	U.S.	8.7	9.5	10	15.2
	W.E.	6.9	8.2	17	18.2
Total (rounded)	U.S.	67.0	80.0	17	175.0
	W.E.	36.0	43.0	19	100.0

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The reader should note that the fluctuating value of the dollar relative to European currencies over the past few years has led to somewhat distorted growth rates being depicted in Exhibit III-20, particularly for 1986-1987. Real growth in Europe for this period was about 21%, not 38% as suggested by the exhibit.

The information services market in the U.S. is considerably larger than that of Western Europe, not only in absolute terms but also relative to population size and GDP. In general, there is much wider acceptance of information service solutions in the U.S. In addition, U.S. user organisations are less risk-averse than European ones in terms of adopting new technology and there is a much more well-developed "service orientation" in the U.S. economy in general than in Western Europe.

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IV

Market Sector Analysis

IV

Market Sector Analysis

A

Processing Services

1. Market Overview and Structure

INPUT has defined this sector as comprising the following delivery modes:

- Transaction, utility and other services
- Processing facilities management

The transaction, utility and other services area, following the advent of widely available low cost computing power, has stabilised into a substantial market, by one barely growing above the level of inflation. Essentially vendors have either been forced to abandon this sector altogether or to exploit opportunities such as payroll processing or financial services where rapid expansion of the sector has outstripped the ability of in-house resources to service them. These opportunities have generally been found where the client is forced to undertake certain processing tasks where they are essential but not strategic. Under there circumstances the processing services vendor can exploit the clients inherent need for a strong 'service' element over and above the basic ? of a computing service.

Processing Facilities Management, or systems operations, is a sector that has been gaining more interest in recent years. Only those facilities management services where the hardware is owned by the vendor are included in this sector. Those services provided on client owned equipment are included written the Professional Services Sector. INPUT tends to prefer the term systems operations since this potentially indicates the negative connotation of the word 'management', the implication of the transfer of responsibility from an information systems executive to a third party. It also widens the potential set of services that a vendor can provide to a client and does not imply simply the day to day operation of his computer facilities.

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INPUT forecasts that the share of this sector of the total European information services industry will fall from 17% in 1988 to 10% in 1993.

2. Market Size and Growth, 1988-1993

In terms of growth rates, the processing services market has been outstripped by the network services sector. Whilst revenues of the network services sector are still far smaller, the difference in growth rates does indicate a shift from the traditional processing services sector and a move by organisations into more third-party services for their network requirements.

The rationale for such a choice is that recourse to a network services supplier allows choice of hardware whilst being able to hand over the network management and the costs of network services to the third party.

However, growth in the U.K. and France is being driven by the provision of financial services that are fostering growth not only in the traditional processing services, but also for electronic information services.

With reference to Exhibits IV-1 and IV-2, INPUT forecasts that the share of this sector of the total European information services industry will grow from $7.3 billion in 1988 to $9.6 billion in 1993, representing an annual growth rate over the five year period of 6%. With reference to Exhibit IV-3, INPUT anticipates that France, West Germany and the U.K. will continue to lead the market in processing services, with the strongest growth being experienced by Spain from a relatively low base.

3. Market Dynamics

a. Processing Services

A continued trend in this sector is that despite the drop in hardware prices, the market for traditional processing services has remained high for vendors in specific markets: ADP in payroll and GEIS in financial settlements and cash and treasury management systems.

Users are looking to concentrate on their core activities, with the result that the improved solutions, allied with the drop in costs to the user, has continued to maintain a relatively buoyant market. In addition, many vendors view processing services as vital in providing a total service solution to users looking for one supplier to handle complex developments and to compensate for the shortage of skilled staff.

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EXHIBIT IV-1

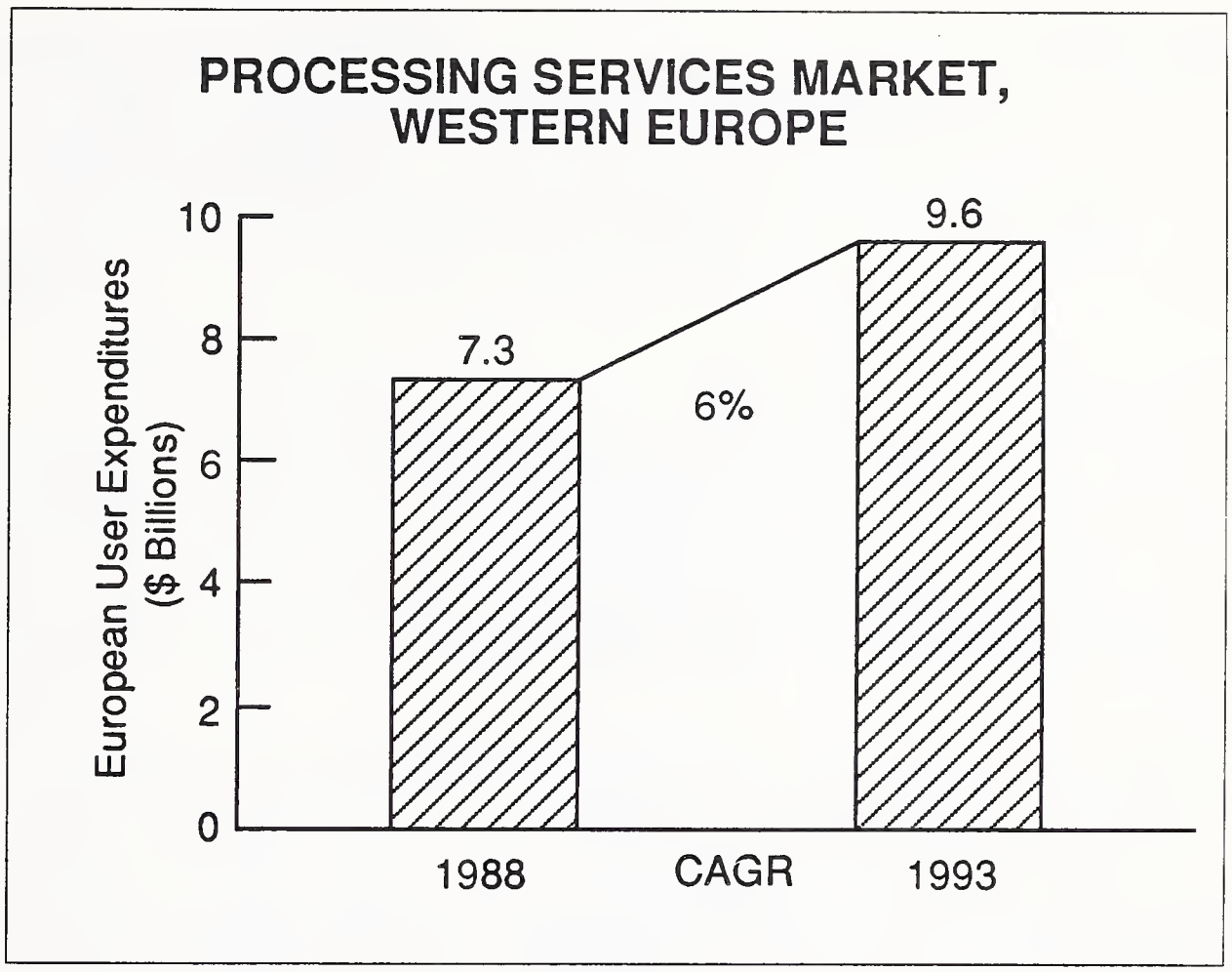

EXHIBIT IV-2

PROCESSING SERVICES MARKET FORECAST, 1988-1993 WESTERN EUROPE

Subsector	Market Forecast ($ Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Transaction, Utility and Other Services	6,410	6,830	5	8,580
Facilities Management	400	480	17	1,060
Total	6,810	7,310	6	9,640

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EXHIBIT IV-3

PROCESSING SERVICES COMPARATIVE COUNTRY MARKETS, WESTERN EUROPE

Country	Market Forecast ($ Millions)			
	1987	1988	1988-1993 CAGR (Percent)	1993
France	1,713	1,797	4	2,150
West Germany	1,352	1,457	6	1,910
United Kingdom	876	946	7	1,320
Italy	725	790	7	1,130
Sweden	354	381	6	520
Denmark	270	290	6	390
Norway	215	228	5	290
Finland	198	216	7	310
Netherlands	371	393	4	480
Belgium	193	205	4	250
Spain	171	197	12	350
Switzerland	205	222	6	290
Austria	119	128	6	170
Rest of Europe	50	56	8	80
Total	6,810	7,310	6	9,640

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b. Facilities Management

INPUT estimates that the European facilities management (FM) market stands at $480 million, with that figure reaching $1 billion in 1993. The change in business climate has led to an increase in use of external contractors and the preference for one-stop shopping has resulted in an upsurge of interest in facilities management.

Facilities management is a way to help corporate objectives, such as restructuring, expansion, rationalisation and acquisition. Companies are looking to vendors with extensive communications capability and large, dispersed organisational infrastructures to compete with internal IS departments; the external company's total skills are used for things such as new development work and facilitating strategy changes (moving hardware supplier or switching from centralised to decentralised operations).

The shortage of skilled specialist staff within user organisations continues to be a major driving force in this market. Consequently, a key vendor strategy should be to promote the FM concept at the corporate level; the decision to accept FM is often a personal decision by the DP managers who may regard the advent of FM as the potential erosion of their responsibilities. The use of the alternative term 'systems operations' addresses this issue.

Vendors should be looking to solve the business solution, in the first instance, by helping clients formulate strategy. This should be followed by assuming total responsibility for the management and implementation of their systems strategy.

The increase in the number of participants in the U.K. market serves as an example of the growth in the FM area: Hoskyns, the acknowledged market leader in the provision of FM services in the U.K., has an impressive track record of over 150 FM contracts, spanning 17 years. The FM part of their business accounted for 36% (£27.4 million) of the Group's turnover, and whilst the size and inherent stability of their FM activities makes growth a key element in their business strategy, the number of competitors and the outward push into Europe indicates that an awareness of service will make the market a more competitive one.

Hoskyns' largest contract so far is the £40 million deal to take over the central computing services of the former GLC. The other large players are EDS, whose clients include National Westminster Bank and Unilever, and Andersen Consulting. With these three having signed their biggest FM contracts in the past nine months, INPUT anticipates further large contracts to be signed in the next year for three essential reasons: Cost, skills and a desire to concentrate on core activities by user organisations.

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FM suppliers offer accountability, signing fixed-price, fixed-term contracts that are legally enforceable. They set out agreed service targets and charges and there are financial penalties if performance promises are not kept. Additionally, the current shortfall of specialist skills is resulting in a fragmentation in the market; companies are increasingly reluctant to hire database, language and communications specialists, thus, FM will continue to grow.

4. Industry Structure—Competitive Environment

The processing services sector is dominated by the large multinationals: GEIS, IBM and EDS. Considerable concentration of supply will take place over the next few years, with the strong niche and full-service suppliers achieving an even stronger market position. Exhibit IV-4 lists the leading vendors in this market sector.

B
Network Services

1. Market Overview and Structure

INPUT has defined this sector as comprising the following sub-sectors:

- Managed network services
- Network applications
- Electronic information services

Managed network services include those services provided purely to manage networks together with enhanced services (VANs in the United States); services like protocol conversion, store and forward and packet switching. Network management is only embryonic at this stage of development as a separately provided changeable service.

Network applications (electronic mail, electronic data interchange, electronic funds transfer) have been experiencing high rates of growth across Western Europe, due in part to the policy of deregulation and liberalisation taking place as a result of EEC initiatives and the prospect of the single European market. Network applications, efficient international networks, good communication links and methods are an intrinsic part of the bedrock of that unified market.

The electronic information services market has been bolstered by developments in financial services, deregulation and the continued demand for information as global trading becomes a prerequisite for success. New market sectors have opened up, and with the advent of CD-ROM, for example, there is further scope for yet more growth.

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EXHIBIT IV-4

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
PROCESSING SERVICES
WESTERN EUROPE

Rank	Company	Market Share (Percent)	Estimated Revenues ($ Millions)
1	IBM	3.7	250
2	Datev	2.9	200
3	GEIS	1.8	120
4	Fiducia	1.5	105
5	CCMC	1.5	100
6	Sligos	1.4	95
7	GSI	1.3	90
8	EDS	1.2	80
9	Telesystemes	1.0	70
10	CISI	0.8	54
	Others	82.9	5,646
	Total Market	100.0	6,810

INPUT forecasts that the share of this sector of the total European software and services industry will increase from 3% in 1988 to over 4% in 1993.

2. Market Size and Growth, 1988-1993

The rapid growth of the network services market has been a feature of the past year. A series of important joint ventures and strategic alliances has taken place all over Europe between companies with different skills that

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are looking to position themselves as the market becomes more sophisticated.

With reference to Exhibits IV-5 and IV-6, INPUT forecasts that the share of this sector of the European software and services industry will grow from $1,240 million in 1988 to $4,280 million in 1993, representing an annual growth rate over the five-year period of 28%.

EXHIBIT IV-5

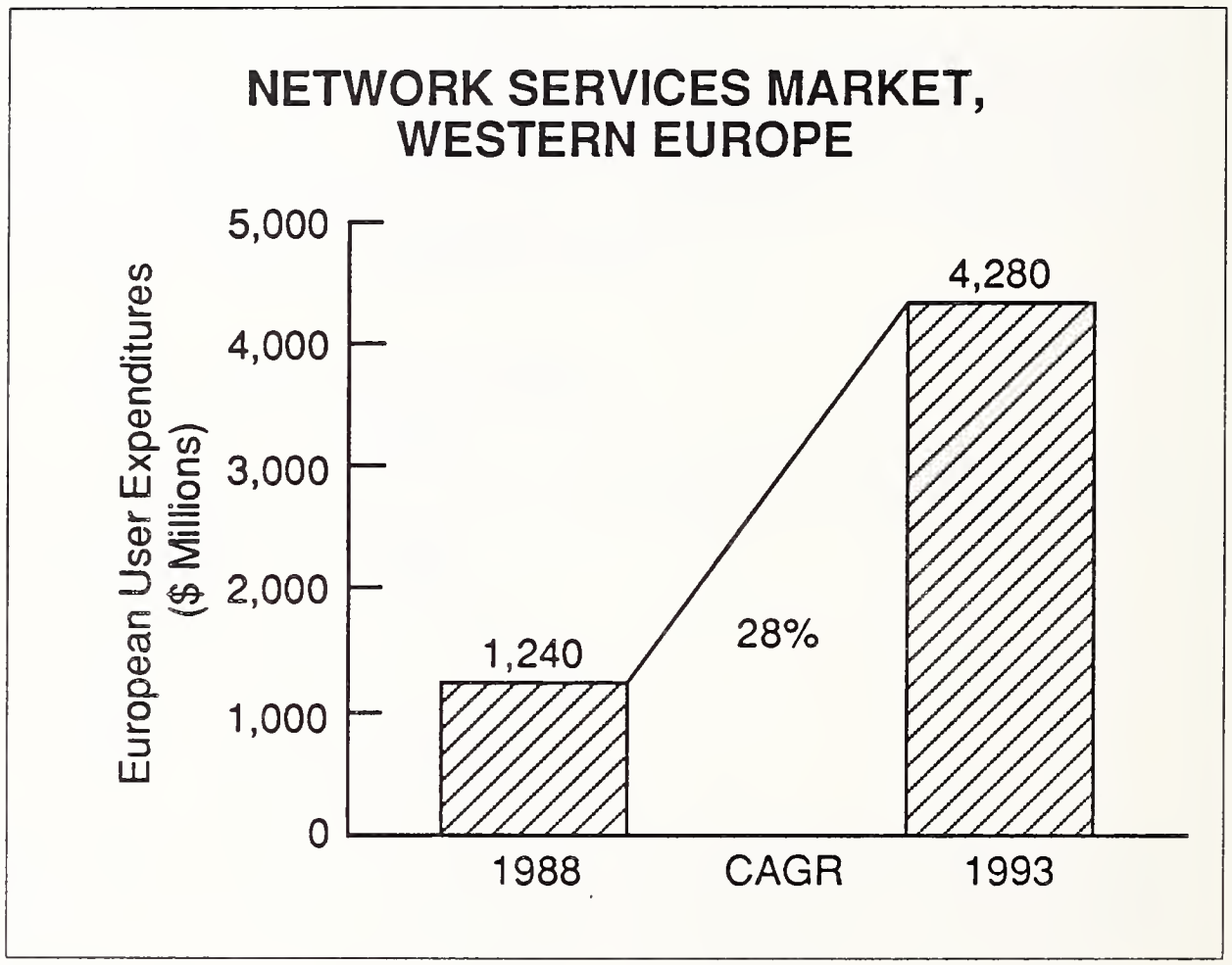

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EXHIBIT IV-6

NETWORK SERVICES MARKET FORECAST
1988-1993
WESTERN EUROPE

Subsector	Market Forecast ($ Millions)			
	1987	1988	1988-1993 CAGR (Percent)	1993
Managed Network Services	35	50	38	250
Network Applications	320	505	34	2,160
Electronic Information Services	535	685	22	1,870
Total	890	1,240	28	4,280

With reference to Exhibit IV-7, INPUT anticipates that France and the U.K. will continue to represent over 50% of the market in network services, with strong growth being experienced by other countries from a relatively low base.

This growth is being helped by the single European market initiative and the subsequent moves by governments to liberalise and deregulate the telecommunications sectors and particularly the area of third-party, or network services.

This strong liberalisation movement, particularly advanced in the U.K., has led to the post, telephone and telegraph companies (PTTs) working together on large pan-European projects (the Managed Data Network Service), as well as with large U.S. corporations such as CSC, in an attempt to provide competition to the large independent network vendors such as IBM and GEIS.

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EXHIBIT IV-7

NETWORK SERVICES COMPARATIVE COUNTRY MARKETS, WESTERN EUROPE

Country	Market Forecast* ($ Millions)			
	1987	1988	1988-1993 CAGR (Percent)	1993
France	225	310	26	1,000
West Germany	96	145	30	540
United Kingdom	280	365	28	1,250
Italy	56	95	33	390
Sweden	17	32	31	130
Denmark	15	19	42	110
Norway	12	17	29	60
Finland	13	17	29	60
Netherlands	54	75	21	200
Belgium	35	45	23	120
Spain	15	18	47	120
Switzerland	57	70	15	140
Austria	7	13	36	60
Rest of Europe	13	25	29	90
Total	890	1,240	28	4,280

*Numbers do not add due to rounding

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3. Market Dynamics

The areas of opportunity in this sector are illustrated in Exhibit IV-8.

EXHIBIT IV-8

NETWORK SERVICES MARKET GROWTH AND OPPORTUNITIES, WESTERN EUROPE

- Electronic Data Interchange
- Total Service Solutions
- Connectivity
- Standards
- Network Interworking
- Shortage of Skilled Staff
- Improved Solutions

a. Managed Network Services

This subsector is expected to experience the highest rate of growth over the next five years within the network services sector. It does however, represent only a very small percentage (4% in 1988) of the overall market for network services and is likely to form only 6% of the total forecast for 1993.

One area of considerable opportunity is considered to be 'network management'. Network management is the payment to a third party by an end user for the provision of a management function over a physical network. From the user's perspective, the opportunity will increase to choose that level of service most appropriate to their organisational needs. Some users will seek the 'total service solution' offered by companies such as IBM and GEIS; others will prefer to select service elements upon which they can build their application delivery.

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INPUT also expects increased penetration of the enhanced services area (called value-added networks, or VANs, in the United States) in order for vendors to strengthen their relationships with their client base. These initiatives will become increasingly prevalent as the European PTTs develop and enhance their basic network services.

Another factor that is likely to have an impact on this subsector is the joint development by the European PTTs of a pan-European Managed Data Network. Originally scheduled for introduction in 1989, it is now unlikely to be realised before 1990 at the earliest.

b. Network Applications

The area of network applications continues to experience strong growth. A concentration of supply is inevitably taking place in more mature markets, such as France and the U.K.

INPUT estimates that the Western European market for network applications will grow from $505 million in 1988 to $2.2 billion in 1993 at a CAGR of 34%.

Factors driving this growth include:

- PTT liberalisation
- Tariff regulation
- Enhanced connectivity standards
- Network interlinking
- Vertical market growth
- Critical mass
- E-mail standards/document standards

In particular EDI (Electronic Data Interchange) is a major growth area. The rest of Europe is likely to follow the U.K. lead and with the PTT's hoping to compete in this area, this is likely to be the most buoyant sector of the network services market.

For a more detailed analysis of this sector readers are recommended to see INPUT's 1988 report entitled *The West European Market for Network Services.*

c. Electronic Information Services

Developments in the area of financial services have extended the life of the more mature market segments, opened up new sectors, such as corporate treasuries, and created opportunities for new software services.

INPUT forecasts that the Western European market for electronic information services will grow from $685 million in 1988 to $1.9 billion by 1993 at a CAGR for the period of 22%.

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4. Industry Structure—Competitive Environment

The network services sector is dominated by the large multinationals—GEIS, IBM and EDS—as can be seen from Exhibit IV-9. Considerable concentration of supply will take place over the next few years with the strong niche and full-service suppliers achieving an even stronger market position.

EXHIBIT IV-9

TOP VENDOR RANKINGS AND MARKET SHARES, 1987 NETWORK SERVICES, WESTERN EUROPE

Rank	Company	Market Share (Percent)	Estimated Revenues ($ Millions)
1	Reuters	22	200
2	IBM	10	90
3	GEIS	7	60
4	Telerate	6	55
5	EDS	3	30
6	Transpac	3	28
7=	GSI	3	25
7=	Sligos	3	25
8	CSC	2	20
9	Telesystemes	2	20
	Others	38	337
	Total Market	100	890

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Positioning in the network services market is particularly important for a successful supplier. Joint ventures and strategic partnerships between complementary organisations have been forged, IBM and GEIS being particularly active throughout Europe—IBM in Italy with Fiat and in France and Spain with Sema Metra; GEIS with Nokia in Scandinavia and in the U.K. with ICL.

The throes of deregulation across Europe have led the PTTs to seek to step up their involvement in order to counter competition and have led a number of PTTs (from France, West Germany, Italy and Spain) to take part ownership of CSC's Infonet network. This development, on the back of the CEPT recommendation to set up a pan-European MDNS, provides the PTTs with a ready-made network that will be able to deal with international traffic.

The U.K. has an enviable position in the electronic information services market—the City of London boasts some of the most sophisticated consumers in Europe. Reuters is a world leader. The picture elsewhere in Europe, with the exceptions of Switzerland and Sweden, is less bright.

C
Software Products

1. General

The software products sector is the second largest of the six categories (after professional services) covered in this report. It is expected to increase in size at a faster rate than the industry as a whole (only network services and systems integration will grow more quickly), so that by 1993 it will be roughly the same size as the professional services sector.

Exhibit IV-10 shows the overall expected forecast growth of the software products sector. The expected 22% per annum growth rate will take this sector in excess of $31 billion by 1993, from a 1988 forecast total of $11.7 billion.

Growth in the United States software sector has been assessed by INPUT at a lower level, about 20% per annum over the five-year period to 1993. This difference is largely accounted for by the higher growth rate for applications software in Europe than in the United States (23% versus 19%). In the past, there has been a generally lower level of acceptance of software application products in Europe. INPUT notes the increasing interest in application package solutions as cost and skilled programmer shortages become stronger and stronger reasons for abandoning in-house development.

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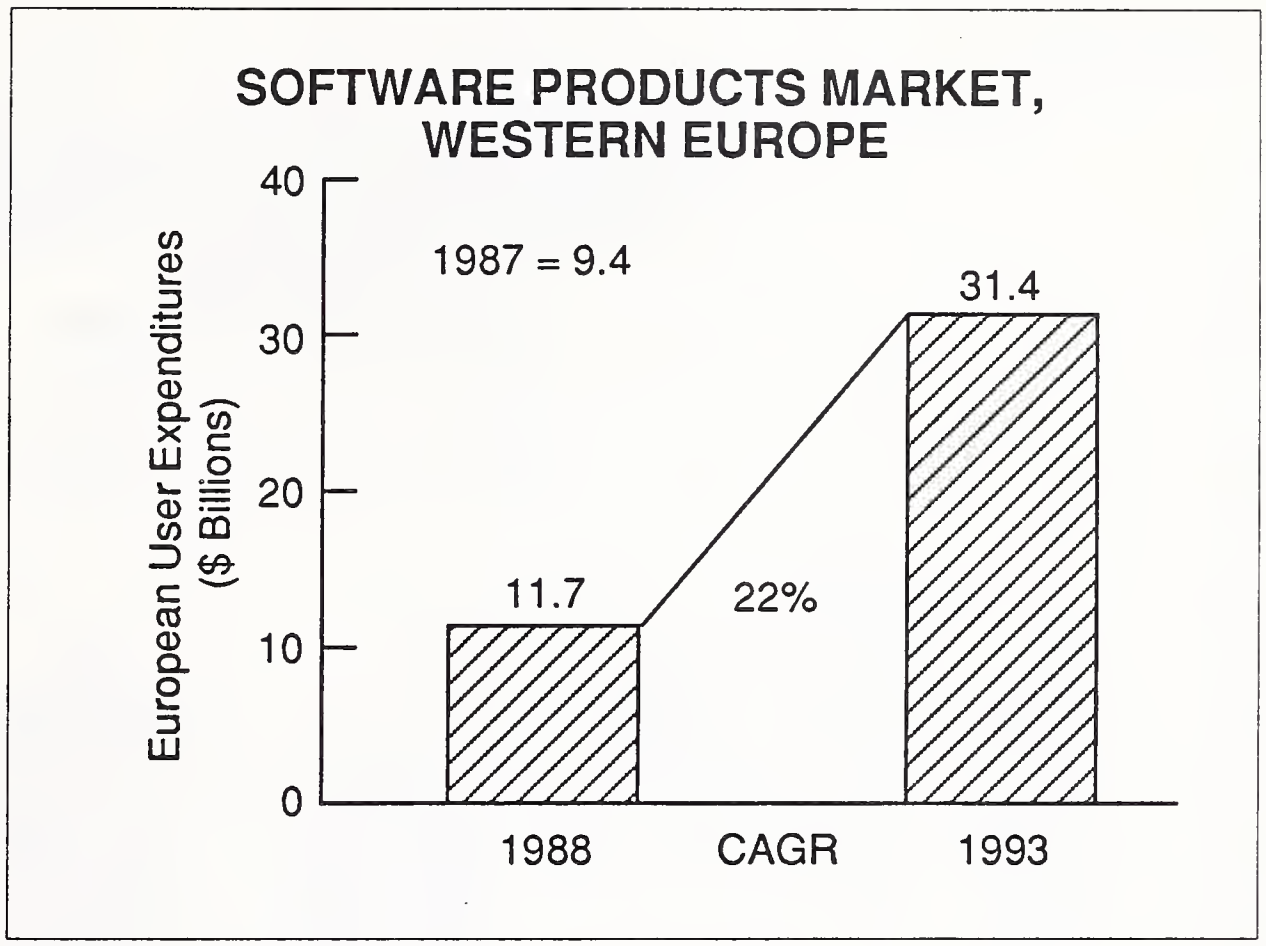
EXHIBIT IV-10



The software products market sector has become an increasingly significant proportion of the information services industry during the 1980s. Exhibit IV-11 graphically shows the increasing percentage share of the entire market contributed by this sector. As low as 10% in 1979, it now accounts for over a quarter of the market and is predicted to reach nearly one-third by 1993. In the United States the corresponding forecast percentage shares for 1988 and 1993 are 32% and 35%.

2. Market Structure

The software products market sector definition encompasses all users' purchases of application and system packages for use on in-house computer systems. All lease and purchase expenditures are included, as well as fees for work performed by the vendor to implement and maintain the package at the user's site. Fees for work performed on these software packages by organisations other than the package vendor are counted in professional services.

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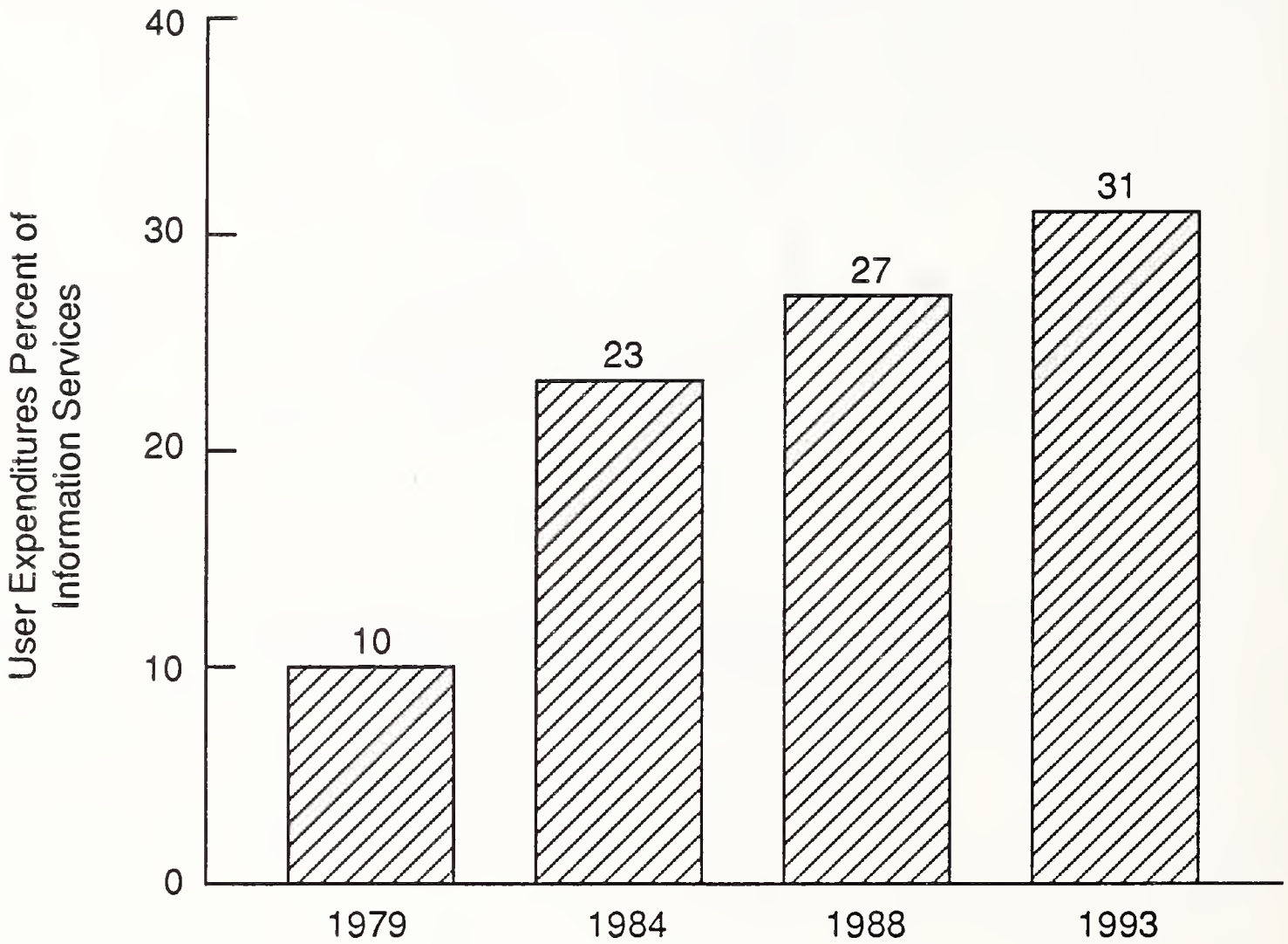
EXHIBIT IV-11

SOFTWARE PRODUCTS PORTION OF SOFTWARE AND SERVICES 1979-1993 WESTERN EUROPE



$ Billions

	1979	1984	1988	1993
Software Products	0.7	2.3	11.7	31.4
Total Information Services	7.2	9.8	42.9	100.7

Exhibit IV-12 provides a schematic representation of INPUT's classification of the software products market, showing the definitions used for the constituents of the systems and applications software subsectors.

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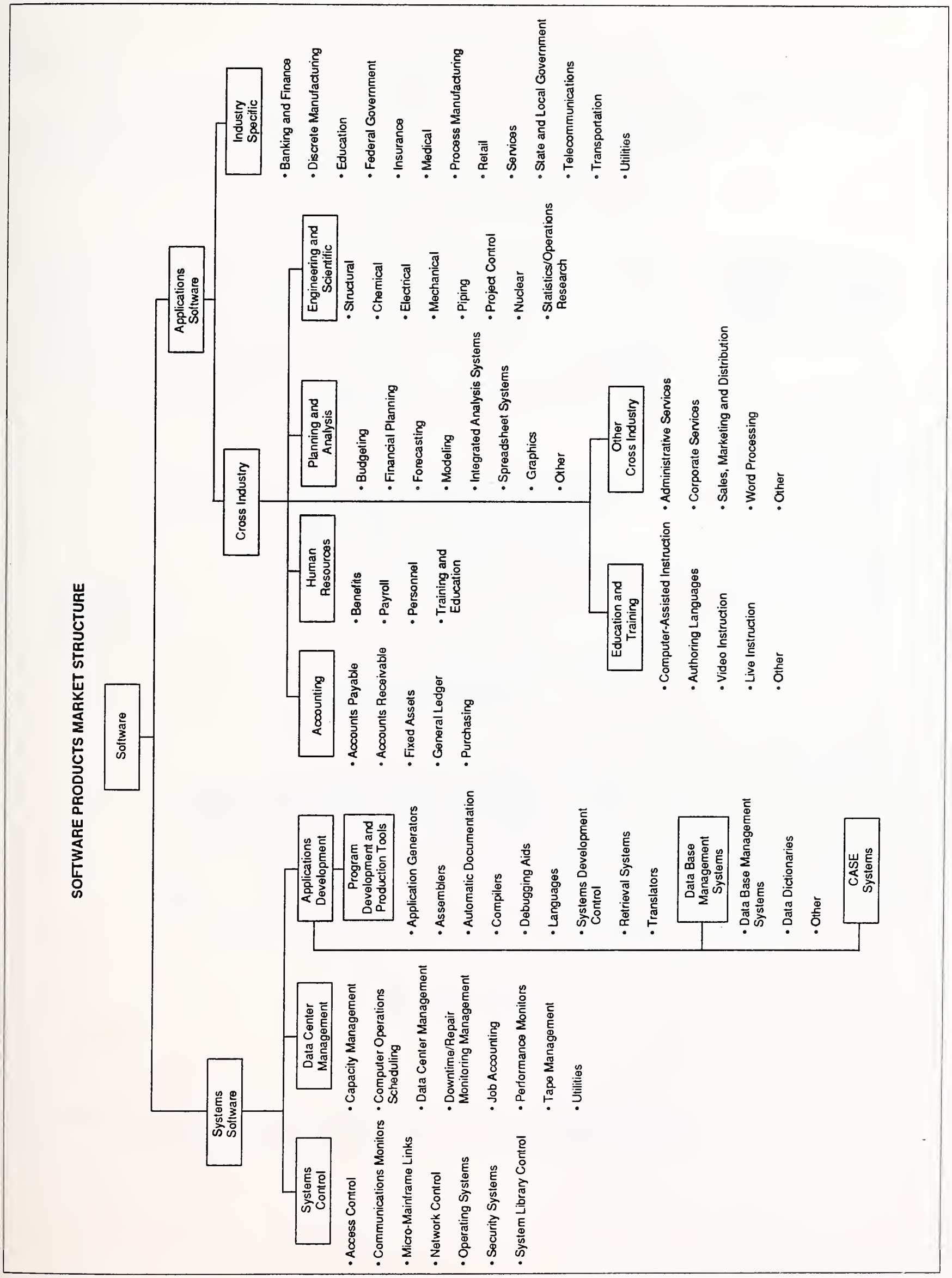
EXHIBIT IV-12



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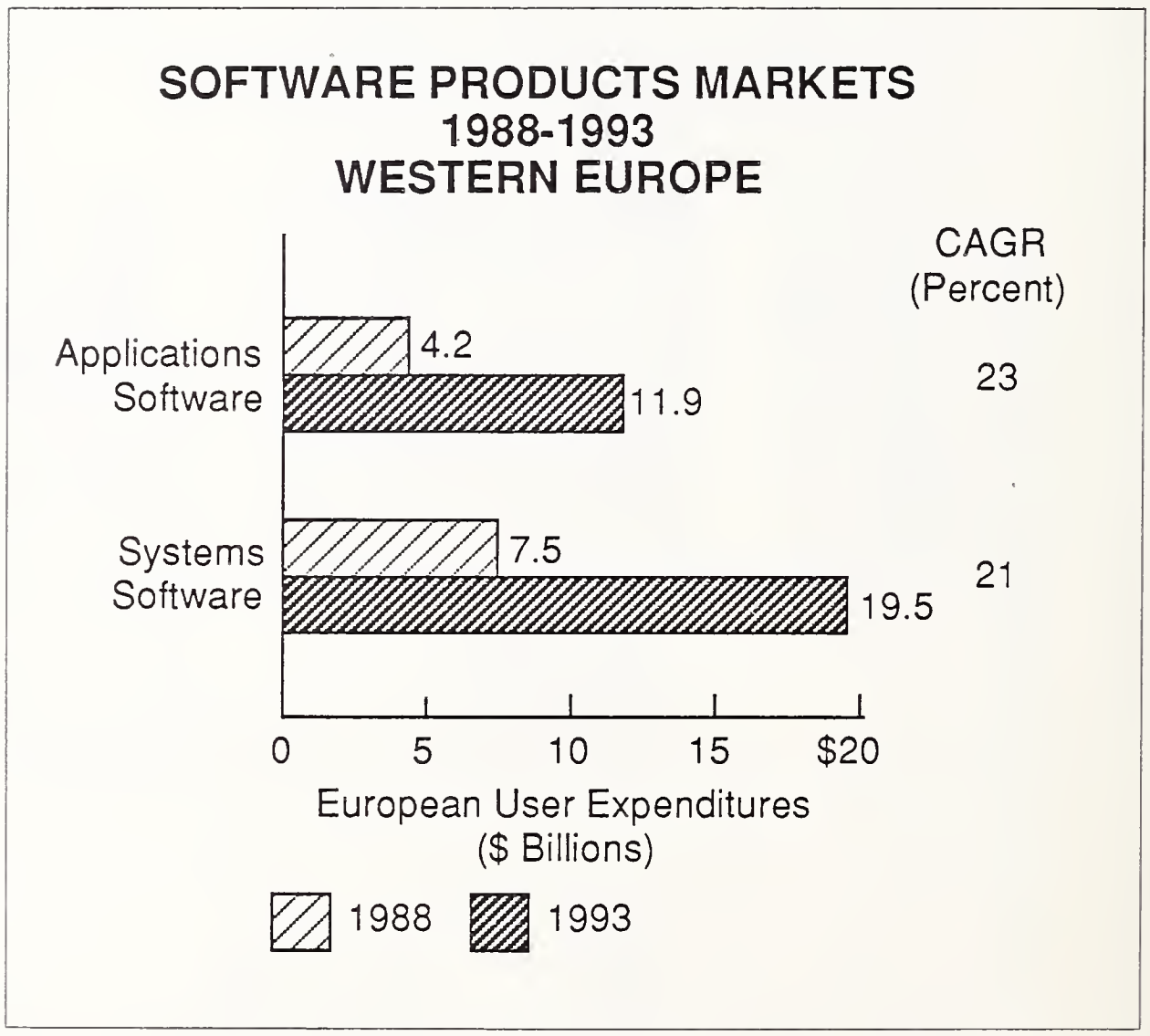
3. Market Size And Growth, 1988-1993

As shown in Exhibit IV-10 INPUT estimates that the total Western European market for software products will reach $11.7 billion in 1988 (having grown 24% from the 1987 level of $9.4 billion). Further, over the five-year forward period, the market will average 22% annual growth to reach over $31 billion by 1993.

Exhibit IV-13 shows the breakdown of the total market between the two principal sectors of applications and system software products. The size disparity between the two is apparent, the systems software sector being approximately twice the size of the applications sector. The applications software market is expected to grow at a marginally faster rate than the systems software market. The European reluctance to purchase package solutions has waned under increasing cost and timescale pressure.

EXHIBIT IV-13



Another breakdown of the market, by mainframe, mini and PC/workstation software products, is shown graphically in Exhibit IV-14.

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EXHIBIT IV-14

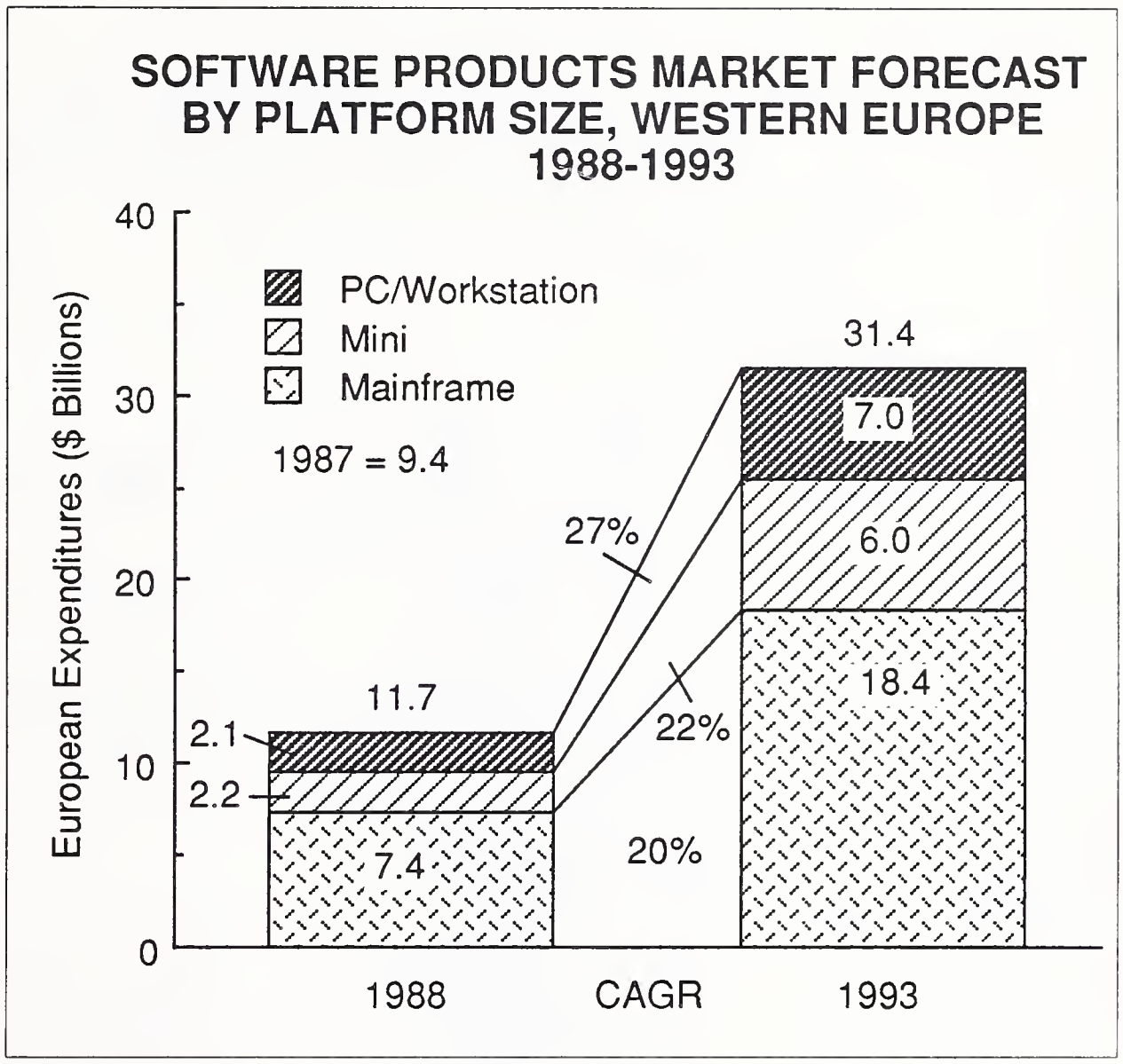

Exhibit IV-15 provides a tabulation of the software products market forecast analysed by systems and applications sectors and by independents and hardware manufacturers. The dominance of the manufacturers can be clearly seen from this table; they have nearly two-thirds of the estimated 1988 market. INPUT anticipates that the manufacturer group will maintain their dominance of this sector. It is forecast that in the 1988-1993 timeframe, hardware manufacturers' business will continue to expand at an overall level of over 21% compared to that of the independents, which is expected to be slightly higher (about 23%).

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EXHIBIT IV-15

SOFTWARE PRODUCTS MARKET FORECAST, 1988-1993 WESTERN EUROPE

Subsector	Market Forecast ($ Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Hardware Manufacturers				
Systems	4,960	6,120	21	15,820
Applications	940	1,180	23	3,380
Subtotal	5,900	7,300	21	19,200
Independents				
Systems	1,100	1,380	22	3,680
Applications	2,420	3,030	23	8,480
Subtotal	3,520	4,410	23	12,160
Total Market				
Systems	6,060	7,500	21	19,500
Applications	3,360	4,210	23	11,860
Total	9,420	11,710	22	31,360

The country market analysis for the software products sector is shown in Exhibit IV-16. The largest individual country market is West Germany, followed closely by France.

In terms of growth rates the highest level is expected in Spain. Higher than average growth is also expected in Italy, the Scandinavian countries (apart from Norway), and in some of the smaller markets like Ireland and Portugal.

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EXHIBIT IV-16

SOFTWARE PRODUCTS
COMPARATIVE COUNTRY MARKETS
WESTERN EUROPE

Country	Market Forecast ($ Millions)			
	1987	1988	1988-1993 AAGR (Percent)	1993
France	2,052	2,556	22	6,810
West Germany	2,113	2,602	21	6,690
United Kingdom	1,644	2,039	22	5,420
Italy	1,140	1,431	23	4,000
Sweden	274	343	23	960
Denmark	209	261	23	730
Norway	169	207	21	540
Finland	152	191	23	530
Netherlands	466	578	22	1,560
Belgium	261	325	22	890
Spain	280	355	25	1,090
Switzerland	381	470	21	1,210
Austria	185	228	21	580
Rest of Europe	95	120	24	350
Total	9,420	11,710	22	31,360

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4. Systems Software Market Segment

a. Overview

Systems software products provide the general "life" and environment to the computer hardware. The more complex and larger the hardware system, the more resources must be managed (productively) and the more sophistication can be provided.

The systems software portion of software products is segmented into the three main areas: systems control, data center management and application development tools. Systems control software (e.g. operating systems, networking tools) provides the first level of software functionality. Applications development tools comprise the next level, allowing development of business applications that provide benefits to the enterprise. Finally, data center management tools provide the capabilities to effectively manage and maximize the performance and resources available in the hardware environment.

A further analysis of the market for application development software can be found in INPUT's report entitled Towards the Fifth Genera*tion—European Market Opportunities 1988-1993*.

Key growth areas for systems software packages are in the computer-aided software engineering (CASE) market, the relational data base management systems (DBMS) market and in the data center management tools market, most notably in job scheduling, capacity planning and tape and disk management.

b. Systems Applications Architecture

IBM's new applications environment/architecture, called Systems Application Architecture (SAA), is a concept whereby applications will span different hardware platforms providing common user interfaces, common functionality and distributed capability.

SAA is important because for the first time, IBM is essentially guaranteeing that applications will work across hardware platforms, thereby protecting application investment. This implies that after an application is developed (of course using those components that make up SAA), the user will be able to migrate to other hardware environments with no major effort expended.

Exhibit IV-17 describes the major elements of SAA. These elements are:

- Common programming interface, which provides languages and tools for application development

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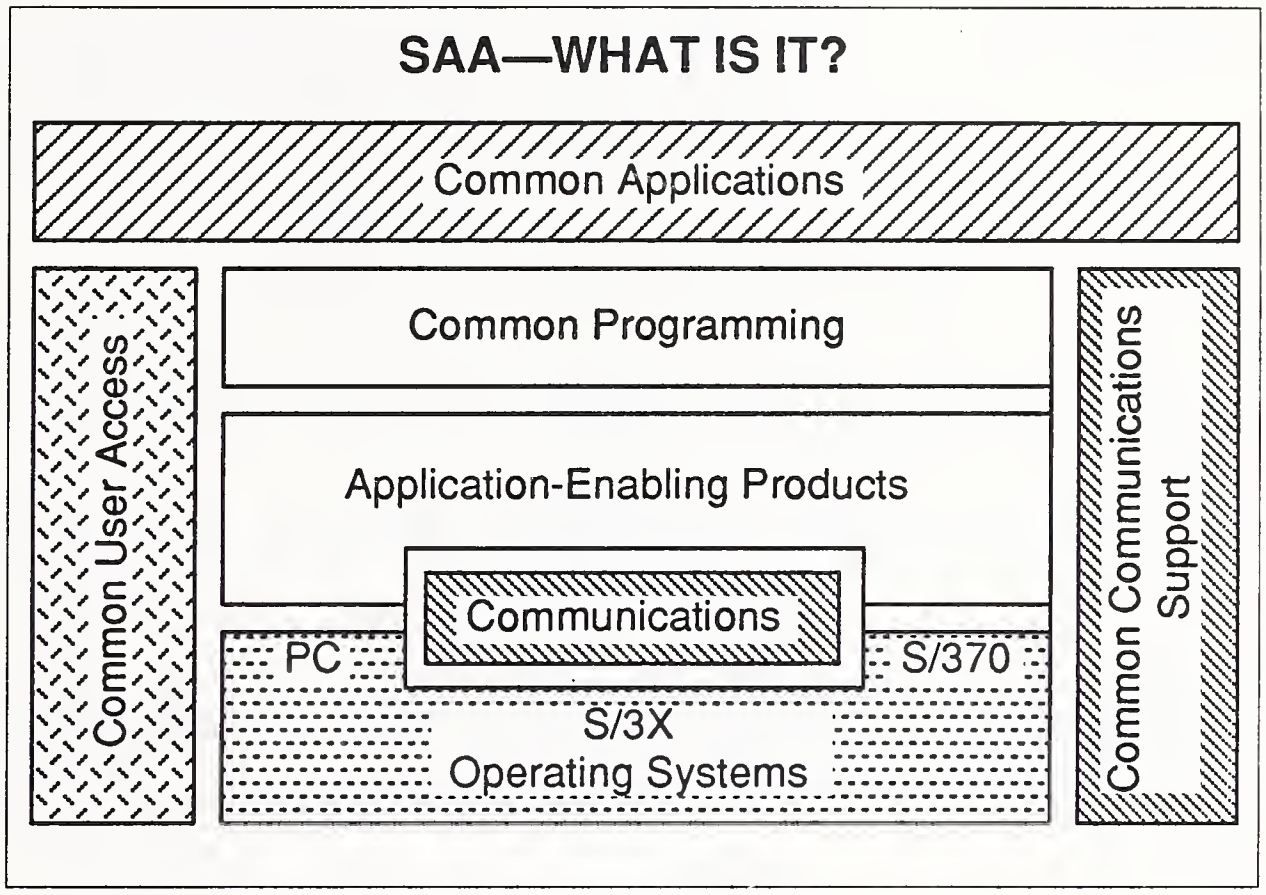
EXHIBIT IV-17



- Common communications support, which provides tools and interfaces to allow IBM platforms to communicate with each other

- Common user access, which provides conventions and standards to describe screens, support user interaction, and describe hardware layouts of keyboards.

- Common applications providing IBM-delivered and -supported applications.

The announcement and implementation of SAA will have a noticeable impact on the software industry. IBM has set new ground rules for applications systems that will cause more competition, better functionality, and probably lower prices. Though SAA may be imperfect in its totality, vendors who do not analyse and determine how to coexist may face difficult times. Exhibit IV-18 lists some of the conclusions that INPUT has reached in looking at SAA and its impact on the market. There is no doubt that IBM is using SAA as a means to maintain dominance in the software market and increase its penetration in application software/systems, an area in which IBM has not been as successful as it was in systems software.

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EXHIBIT IV-18

SAA IMPLICATIONS

SAA Will:

- Drive Product Consolidation
- Be a User Requirement
- Drive New Applications/Products
- Drive Software Pricing
- Reshape the Software Industry

5. Applications Software Market

As shown earlier in Exhibit IV-13, the market for applications software in Western Europe is estimated at around $4.2 billion in 1988. It is expected to grow at an compound annual growth rate (CAGR) of around 23% to reach $11.9 billion by 1993.

Among the factors driving this growth are:

- The shortage of skilled programmers, making a case for abandoning in-house development
- Increasing numbers of installed computer systems, particularly minicomputers, workstations and PCs
- Cost and timescale pressures on users, making standard packages a more practical alternative than custom solutions
- The availability of more and better packages
- The movement towards standards, potentially providing vendors with a more stable environment within which to operate

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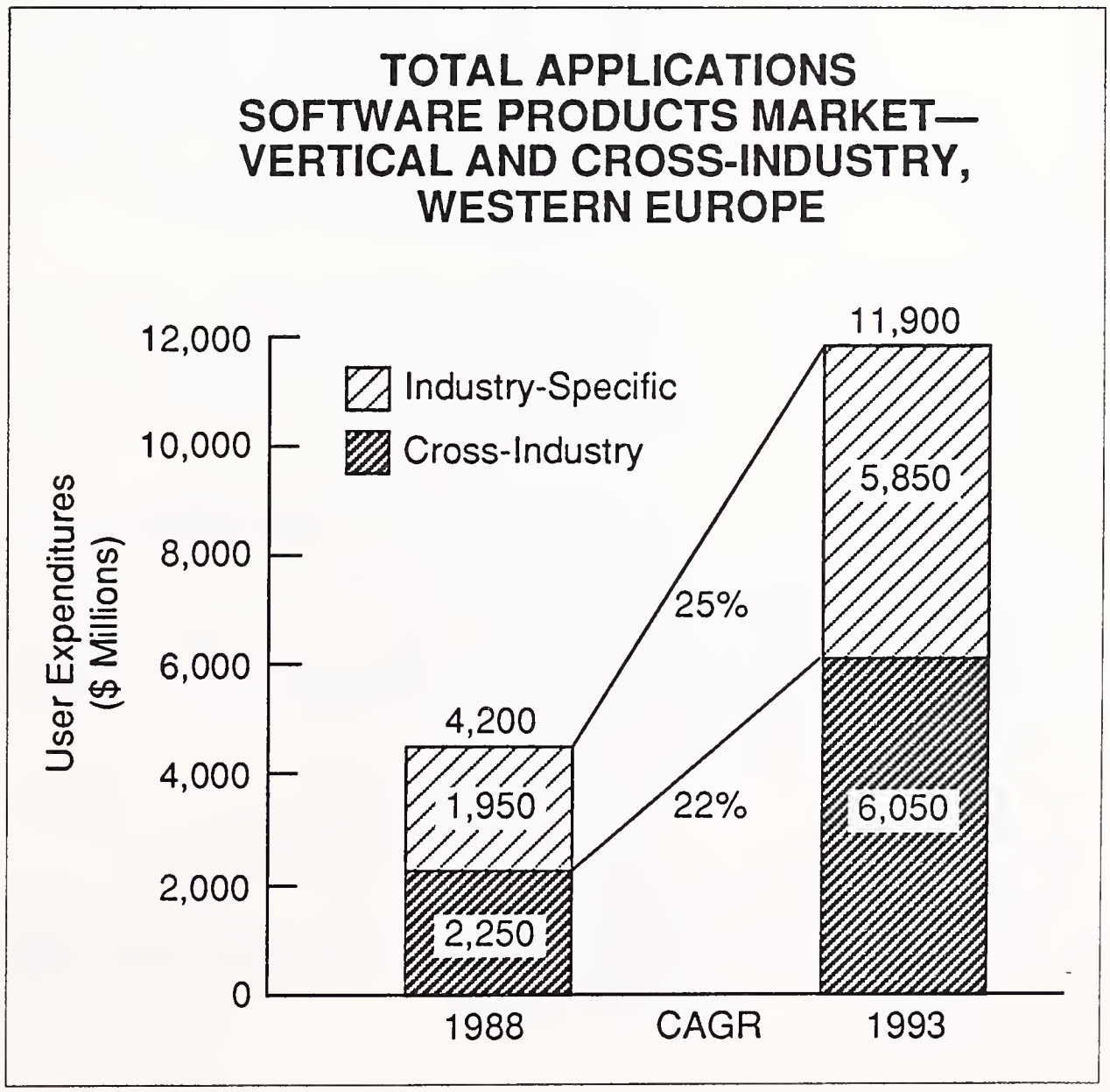
Threats to the growth of this market include:

- Price reductions due to increased competition
- A continuing preference by European users for individual solutions
- Different requirements in different European countries
- A threat at the upper end of the market from flexible 4GL development tools, which enable users to develop their own applications.

INPUT estimates that the market for industry-specific (vertical) applications software products will account for around 45% of the total market in 1988.

As shown in Exhibit IV-19, the industry-specific sector is expected to grow at an average annual rate of 25%, while the cross-industry sector is predicted to experience a slower growth rate of about 22% over the period 1988 to 1993.

EXHIBIT IV-19



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Thus INPUT forecasts that industry-specific applications software products will account for a larger share (almost 50%) of the total market by 1993.

The three largest industry-specific markets are:

- Manufacturing
- Banking and finance
- Distribution

These three industries are estimated to account for over half of the total industry-specific applications software products market.

The manufacturing sector will continue to be very important as users strive to improve their performance through automation. Vendors are now advocating integrated systems that embrace every stage of the manufacturing life cycle as well as link? manufacturing applications to non-manufacturing ones such as distribution, accounting, etc.

Applications software for the banking and finance sector is being increasingly supplied by third-party software companies, reducing the proportion developed in-house. Banks are being forced to look at standard solutions where possible in order to reduce costs. However, the demand for custom software will also remain strong as banks and other financial institutions strive for competitive advantage by providing services that are not offered by their competitors.

The market for industry-specific applications software in the distribution sector is expected to show high growth over the next few years. The retail trade in particular is expected to increase investment considerably in order to improve service and cut costs.

The boundary that separates standard and customised applications software is becoming increasingly blurred. This blurring is being driven by two major developments:

- Software product and professional services vendors are building custom systems from "kernels" or reusable component programmes.

- Certain vendors (e.g. Cincom, Cullinet, Ashton-Tate) are using the package-plus-language approach, whereby fourth-generation languages are used to build applications around the central database.

The common aim of these approaches is to provide customer-specific solutions without the cost and manpower requirements of fully customised software.

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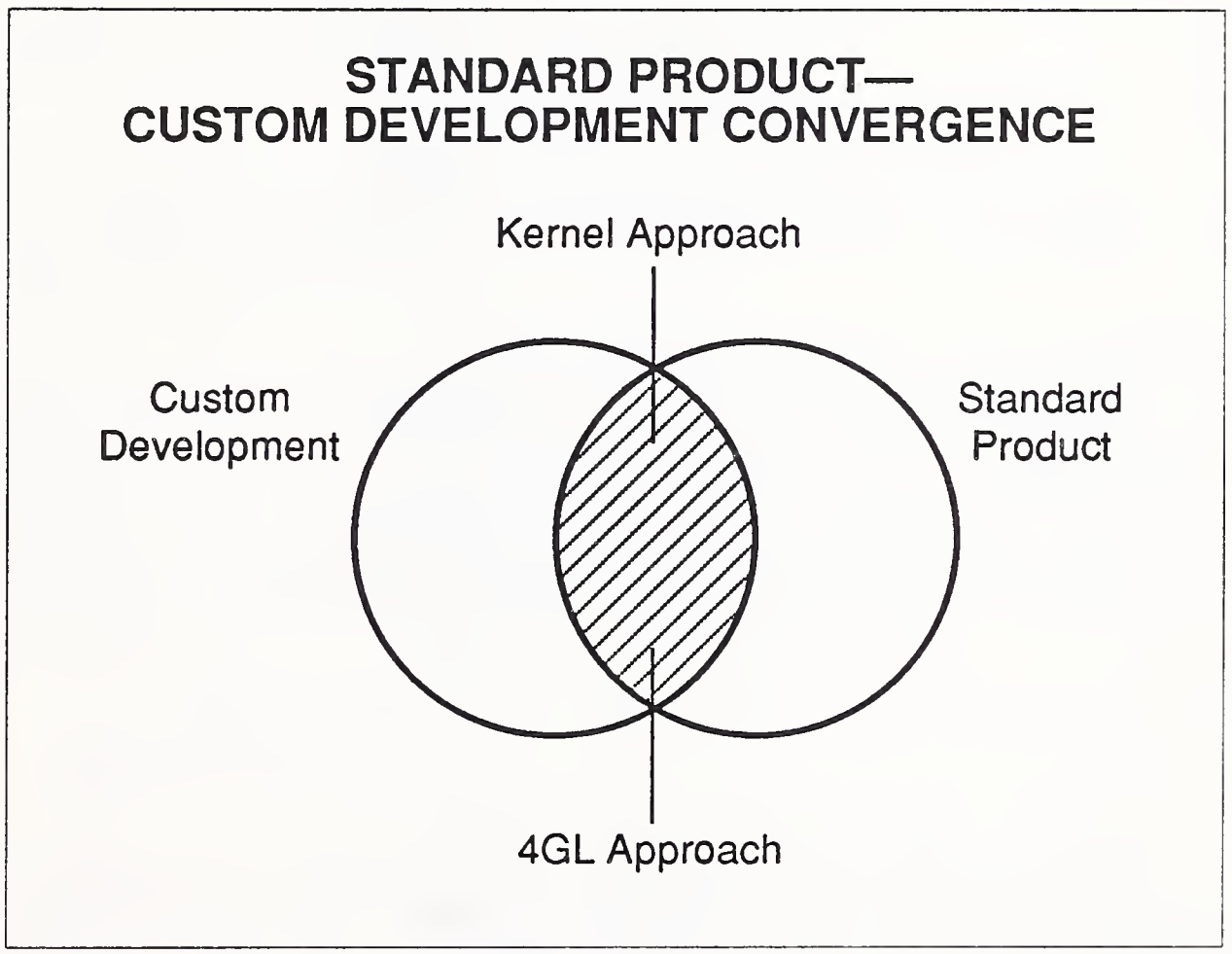
The result, as illustrated in Exhibit IV-20, is that the activities of software package suppliers and professional services companies have started to move closer together. Vendors face the marketing challenge of deciding whether to position themselves as product or service vendors.

Detailed analysis and forecasts on the applications software market can be found in INPUT's report entitled *Applications Software Opportunities—Western Europe, 1988.*

EXHIBIT IV-20



6. Competitive Analysis

The leading software products vendors in the European marketplace are listed in Exhibit IV-21. IBM has about 20% of the software products market. Most of these revenues are for mainframe systems software. The leading independent vendor, Computer Associates, achieved a market share of under 2%, indicating the fragmented nature of this market.

U.S.-based companies occupy ten of the positions in Exhibit IV-21. This reflects the worldwide success of American software product vendors. These companies are far bigger than any European-owned software product companies.

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EXHIBIT IV-21

TOP VENDOR RANKINGS AND MARKET SHARES, 1987 SOFTWARE PRODUCTS, WESTERN EUROPE

Rank	Company	Market Share (Percent)	Estimated Revenues ($ Millions)
1	IBM	19.6	1,850
2	Siemens	3.4	320
3	Unisys	2.9	270
4	Digital	2.0	190
5	Computer Associates	1.8	170
6	Bull	1.6	150
7	Nixdorf	1.5	145
8	Olivetti	1.4	135
9	Microsoft	1.2	115
10	Software AG	1.0	90
11	SAP	0.7	70
12	Lotus Development	0.7	64
13	Ashton-Tate	0.6	58
14	GSI	0.5	50
15	MSA	0.5	45
16=	CGI	0.4	40
16=	Hewlett-Packard	0.4	40
18	BIS	0.4	39
19=	Thorn Software	0.4	37
19=	Oracle	0.4	37
	Others	58.4	5,505
	Total Market	100.0	9,420

On the whole European firms lack the marketing skills of their U.S. counterparts (e.g. Microsoft, Lotus), and the financial resources to make the huge investment required to develop the more complex systems soft-

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ware for mainframes (like that developed by Computer Associates, for example).

Nevertheless, a handful of European independent vendors have established themselves as prominent players in the software products market. The most notable of these are the German companies Software AG and SAP.

Software AG is the largest European-owned independent company represented in Exhibit IV-21. It has also enjoyed considerable success in the U.S., with 1987 revenues of over $200 million.

SAP's success has been largely confined to the German market. Its growth rate over the past few years has been exceptional (revenues increased by 60% in 1987 alone), and future expansion will be mainly aimed at foreign markets.

It is important to note the relative revenue position between the independent vendors and the equipment manufacturers. For example IBM, the largest vendor of software products amongst the manufacturer group, is estimated to have had revenues in Europe of $1.85 billion in 1987, more than ten times those of its largest independent competitor, Computer Associates. As shown in Exhibit IV-21, the equipment manufacturers occupy the top four positions and seven of the top ten.

D

Professional Services

1. Introduction

Professional services have continued during 1988 to offer considerable opportunities for service vendors. The professional services sector, along with the software products sector, represent the widest and largest areas of opportunity. INPUT forecasts that the share of this sector of the total information services industry will continue to grow from 30% of the total market in 1988 to 32% in 1993. With reference to Exhibit IV-22, the overall market projection from 1988 through to 1993 is estimated to run at a compound annual growth rate of 20% to reach $32 billion in 1993.

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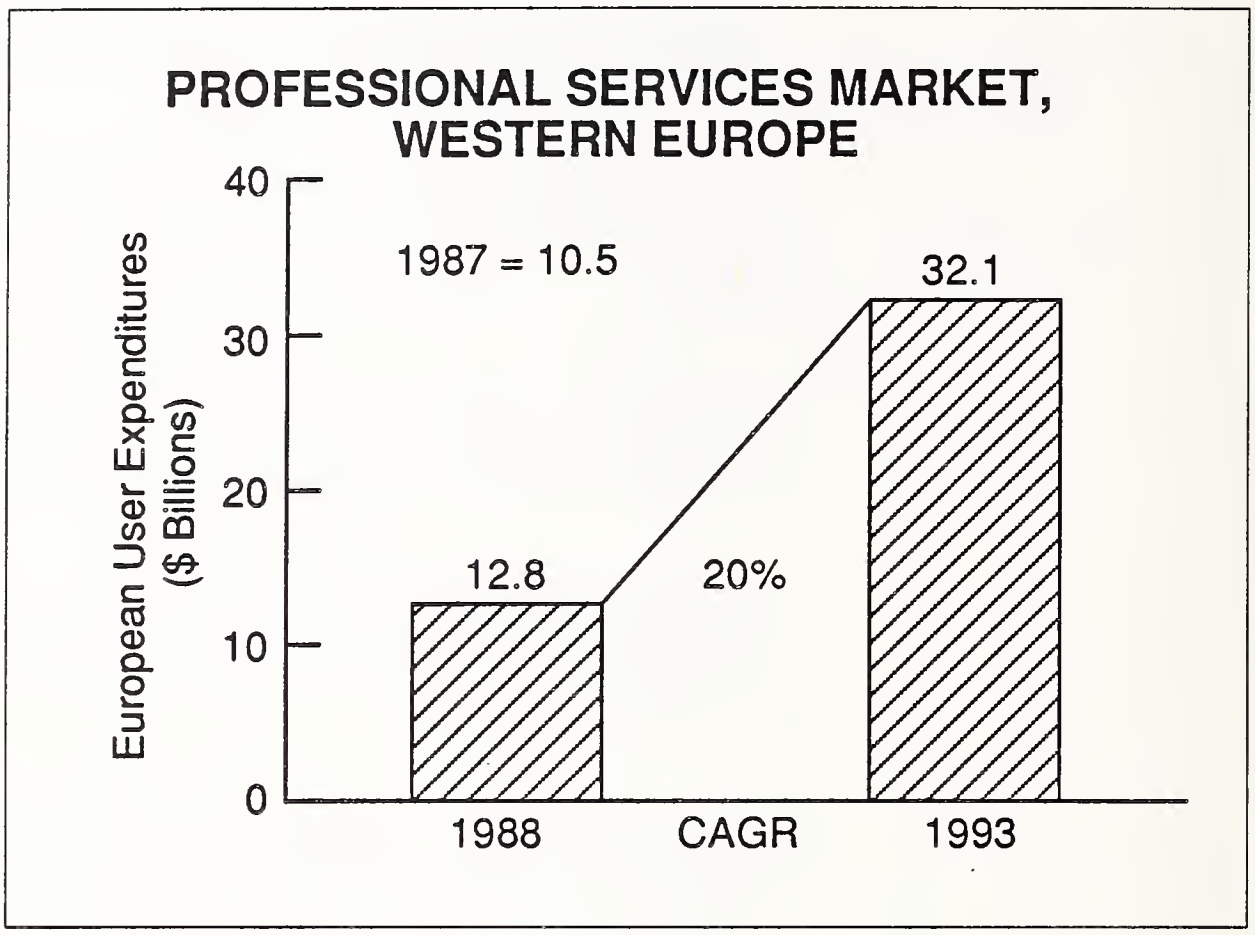
EXHIBIT IV-22



2. Market Structure

INPUT's schematic representation of the structure of the professional services sector by type of activity is given in Exhibit IV-23.

This exhibit shows this sector as comprising four main subsectors, as opposed to the six shown in INPUT's 1987 survey of the industry. The two separate subsectors removed are:

- Contract staff
- Systems integration

Contract staff revenues have been incorporated within the custom software development subsector for the following reasons. Principally, there is increasing difficulty in adequately defining the distinction between those services in which staff are simply provided on a fee basis and those in which some further level of responsibility is implied. Additionally, this definitional change aligns it with those used by INPUT for the United States market.

The systems integration sector has been separated out as a completely separate industry sector in recognition of its particular importance as a new and fast-developing opportunity. This change has also allowed a full evaluation of end-user revenues for systems integration to be included within the overall market size assessment. Systems integration

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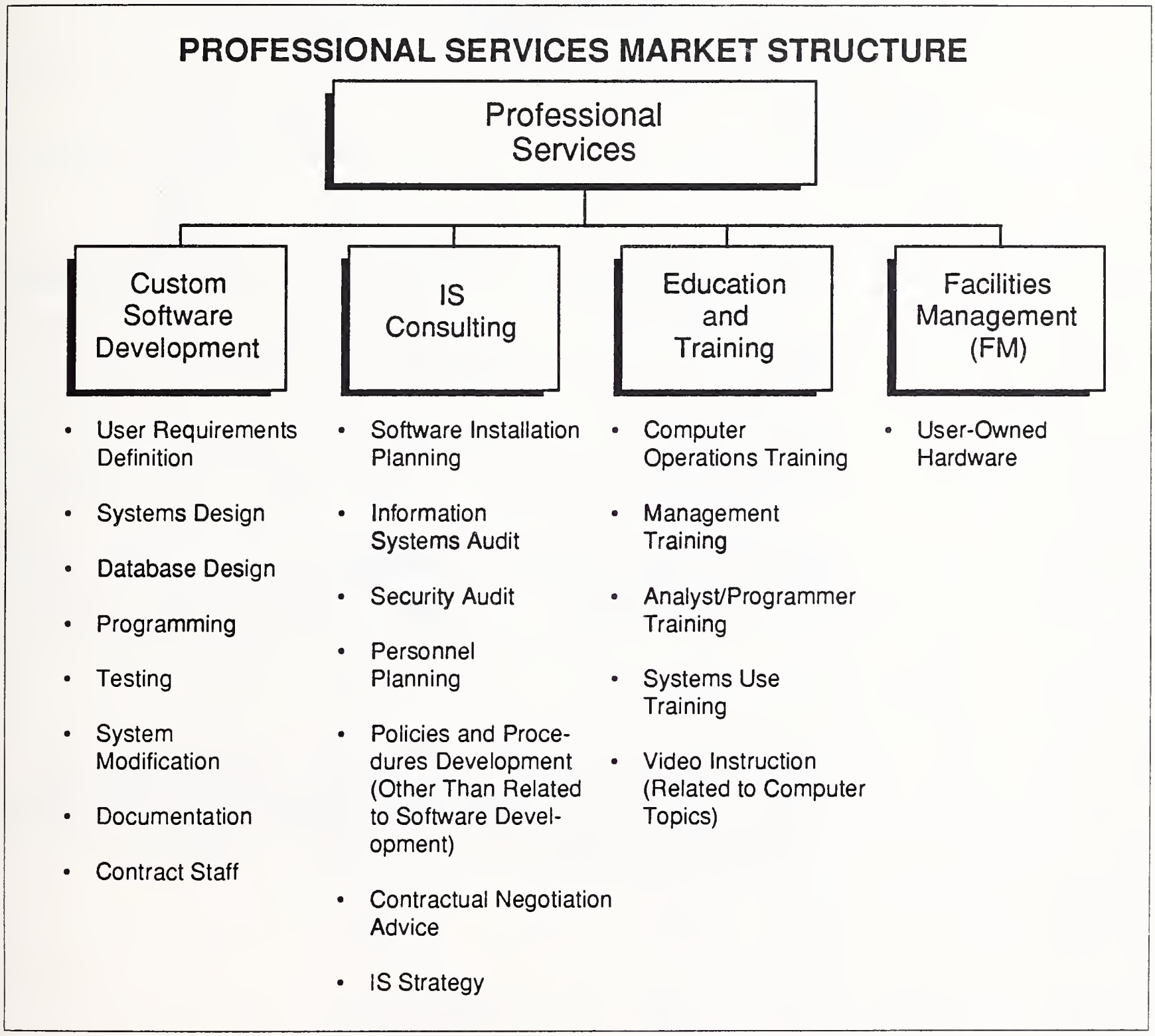
EXHIBIT IV-23



end-user revenues (discussed in the next subsection) include hardware, software products and all other services provided on a single prime contractor basis.

3. Market Size and Growth, 1988-1993

Forecasts of the European professional services market by segment and country market are given in Exhibits IV-24 and IV-25.

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EXHIBIT IV-24

PROFESSIONAL SERVICES MARKET FORECAST, 1988-1993 WESTERN EUROPE

Subsector	Market Forecast ($ Millions)			
	1987	1988	1988-1993 CAGR (Percent)	1993
IS Consultancy	1,280	1,580	22	4,210
Custom Software Development	7,930	9,720	20	24,260
Education and Training	1,145	1,390	19	3,320
Facilities Management	95	116	21	300
Total (Rounded)	10,450	12,810	20	32,090

INPUT estimates that the professional services sector will grow from a base of $10.5 billion in 1987 to $12.8 billion in 1988 a growth rate of 23%. The five-year projection shows a market size of $32 billion being achieved by 1993, representing a compound annual growth rate of 20% for the period 1988-1993.

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EXHIBIT IV-25

PROFESSIONAL SERVICES COMPARATIVE COUNTRY MARKETS WESTERN EUROPE

Country	Market Forecast ($ Millions)			
	1987	1988	1988-1993 CAGR (Percent)	1993
France	3,119	3,811	20	9,490
West Germany	1,677	2,036	19	4,830
United Kingdom	2,034	2,492	20	6,310
Italy	1,055	1,320	23	3,690
Sweden	320	394	19	960
Denmark	219	270	20	660
Norway	178	215	18	500
Finland	163	202	20	500
Netherlands	600	731	19	1,725
Belgium	323	396	19	950
Spain	238	300	24	880
Switzerland	306	374	19	900
Austria	142	172	19	410
Rest of Europe	79	99	23	280
Total (rounded)	10,450	12,810	20	32,090

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4. Market Dynamics

The demand for professional services within the computer industry is influenced by a variety of factors, the most significant of which are listed in Exhibit IV-26.

EXHIBIT IV-26

PROFESSIONAL SERVICES MARKET DRIVING FORCES

- New Hardware, Software and Communications Products
- Changes in the Business, Commercial and Administrative Environments
- Increasing Reliance on Information Systems Infrastructure
- Demand for Specialised Skills

Essentially, the entire computer industry is driven by the new technological developments that have continuously poured onto the market as new computer hardware and software products. These new products, and increasingly communications products, strongly influence the growth of professional services. They instigate new applications and the need for the skills to develop and integrate them into the user environment.

New products also create the need for very specific skills, which are generally in short supply at the first introduction of the product. For example, the introduction of the AS/400 or Digital's VAXcluster require special skills needed to ensure maximum system performance. Software systems like IBM's Systems Application Architecture (SAA) or operating system environments like UNIX create opportunities for professional services vendors. Communications products such as local- and wide-area networks, integrated voice/data applications and micro-to-mainframe links also provide new opportunities for professional services vendors.

At the same time, the overall environment in which organisations are operating is changing. This environmental change affects business,

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commerce and administration. The application of the products of high-technology research, beyond the computer and telecommunications industries is causing this environmental change. The increasing speed of information and data dissemination is causing increased competition through internationalisation and the speed of response needed to retain a competitive edge. Just-in-time inventory systems, factory automation, and highly responsive retail systems are just some examples. Organisational structures are beginning to change under the onslaught of these advances, which in turn demand complex computer system control and new skills rarely present in-house. Professional services vendors can fulfill these needs.

As these highly complex and heterogeneous systems are installed within organizations, they become critical to the continued successful operation of that organisation. Airlines and banks are two very clear examples of this phenomenon. The application of EDI (Electronic Data Interchange) will create this effect as organisational hierarchies react to the possibilities of this increasingly widely used method of business communication.

All of these pressures, both environmental and technological, feed the need for specialised computers and communications skills. Increasingly, the requisite skill sets are not met from internal sources but can only be found from professional services firms, thus driving the growth of the professional services sector.

There exist, of course, some potential inhibitors to growth of this market. The principal threats to the growth of the professional services sector comes from:

- Lack of qualified personnel
- Packaged software products
- Antiservice attitudes

Although it is a demand driver for professional services, lack of qualified staff is, at the same time, a potential growth inhibitor. Over the next five years, professional services firms are likely to find increasing difficulty in recruiting sufficient qualified staff, particularly younger people. Those organisations that have tended to place particular emphasis on the recruitment of young people may well have to consider recruiting more women and older people and possibly utilising off-shore resources. A further implication of this trend will be the increased emphasis on training and restraining of human resources.

The increasing acceptance of packaged software products will represent a viable alternative to professional services, particularly in more established and well-understood applications. Once the application is sufficiently well understood by the vendor for it to produce a package solution that typically meets at least 80% of users' needs, then the shift to pack-

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ages becomes a viable commercial proposition. Package modification, rather than custom work represents a professional services opportunity and is a market driver in its own right.

Another potential inhibitor related to this topic is software engineering systems. These systems hold the possibility of reducing the need for scarce human resources through the automation of the software development process. Whilst they undoubtedly will continue to grow in acceptance and use, INPUT does not believe that they will fundamentally hold back the growth of professional services. They are largely efficacious in the automation of the code generation process and do not address the much larger area of integration and implementation within the working environment. For a more detailed discussion of this topic, readers are referred to INPUT's report Towards the F*ifth Generation*, (SFGE), December 1988.

A potential inhibitor that is always present is the antiservice attitude of many organizations. Typically, the belief is that information systems are so important to an organisation's infrastructure and competitive position that they cannot possibly be entrusted to a third party. The sheer strength of the driving forces already discussed are gradually breaking down this attitude.

5. Competitive Environment

INPUT's assessment of the top ten vendor rankings by market share for professional service companies is given in Exhibit IV-27. This ranking list is dominated by IBM and Cap Gemini Sogeti. Cap Gemini's revenues are mainly derived in France, though Cap Gemini is strong in most European markets with the notable exception of the U.K. Other leading professional services firms are Unisys, Finsiel, and the Sema Group (Sema Metra and CAP Group PLC). It can be seen that the Sema Group's combined revenues for 1987 would put them in third place; the companies merged in early 1988 to form a group with strong representation in all the major European markets.

Another company shown in this list, Scicon, was acquired by Systems Designers around the same time. The new company, SD-Scicon, is also a very significant participant in the major European markets. In contrast, Finsiel derives its revenues almost exclusively from the Italian market.

An important characteristic of the professional services competitive environment is the presence of two different types of vendor, both of which have a substantial presence. These two groups are:

- Traditional professional services firms
- Equipment vendors

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EXHIBIT IV-27

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
PROFESSIONAL SERVICES
WESTERN EUROPE

Rank	Vendor	Market Share (Percent)	Estimated Revenues ($ Millions)
1	IBM	5.7	600
2	Cap Gemini Sogeti	3.3	350
3	Unisys	2.4	250
4	Digital	2.3	240
5	Finsiel	2.0	210
6	Sema Metra	1.4	150
7	Volmac	1.3	135
8	CISI	1.2	128
9 =	Logica	1.1	110
9 =	CAP Group	1.0	100
11	Steria	1.0	100
12 =	Nixdorf	0.8	85
12 =	Bull	0.8	80
12 =	Scicon	0.8	80
15	Andersen Consulting	0.8	80
16	Siemens	0.7	70
17 =	Sligos	0.6	60
17 =	Telesystemes	0.6	60
19 =	Sopra	0.5	55
19 =	Syseca	0.5	55
	Others	71.0	7,450
	Total	100.0	10,450

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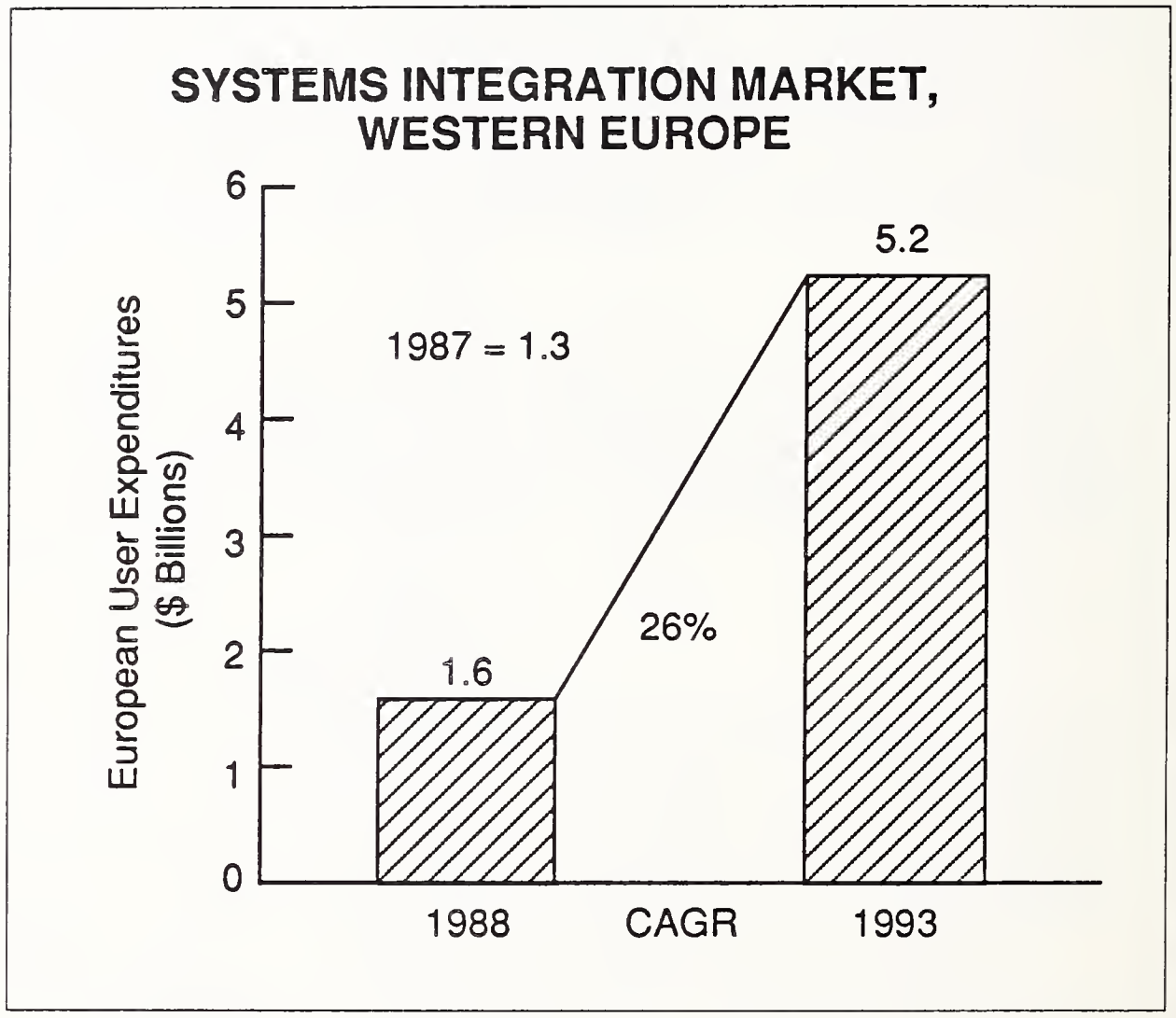
Amongst the top twenty vendors shown in Exhibit IV-28 there are 14 traditional professional services firms, for example Cap Gemini Sogeti, Finsiel, Sema Metra and Volmac. Traditional professional services are fundamentally those whose only business is offering people-dependent services associated with information systems. These 14 vendors account for 60% of the revenues generated by the top twenty comparing listed in Exhibit IV-28.

EXHIBIT IV-28



The remaining 40% is accounted for by only six firms, all vendors of computer equipment. It can be anticipated that equipment vendors will seek to develop further their stake in the professional services business. It has become increasingly apparent that it is no longer sufficient to be simply a vendor of hardware and basic operating systems when marketing to users. Complete or partial solutions to user needs, an understanding of the client industry and deeper involvement in the client's use of the system have all become key features of the competitive environment.

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E

Systems Integration

1. Market Overview and Structure

The term 'systems integration' has become increasingly more widely used over the last few years within the computer industry. INPUT defines it as implying:

- 'The provision of an integrated solution to a multidisciplinary information systems requirement.'

Thus, the systems integration services sector is the market for those services that are carried out for an organisation by a third party. Although this is not a new concept as such, and indeed has been normal practice for most defense-sector-related work, it has now achieved sufficient critical mass in the commercial area to warrant separate identification as its own sector.

Exhibit IV-28 shows INPUT's overall assessment of the size and growth prospects for this sector of the computer software and services industry. Overall growth is assessed at an annual rate of 26% to achieve a market size of $5 billion by 1993.

Systems integration is an approach to the development of new, upgraded or expanded information systems for client organisations. In this approach, a vendor or team of vendors assumes responsibility for providing the information products and services that result in a comprehensive solution to the client's information systems problem.

The approach is most applicable to major project efforts that involve the development of complex, multidisciplinary systems. The typical size of these projects, the fact that large portions of the software must be custom-developed, and/or the substantial network requirements usually means that the total project effort is multiyear.

These projects involve not only the actual integration or interfacing of the components of the solution, but also:

- The detailed systems analysis of the problem
- Design of the solution
- Selection, development, and implementation of the hardware and software
- Such post-implementation support as testing, client staff training, documentation, and, in some instances, operation and maintenance of the developed system for a specified period of time.

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Generally, these project are bound at the start by the selection of the successful bidder and at the end by the acceptance of the new system by the client. The close relationship established between the vendor and the contractor can lead to sales of additional products or services unrelated to the project, but these opportunities have been explicitly excluded by INPUT in the development of the forecast.

Critical to the approach from both the client's and the vendor's perspectives is the sharing or total transfer of responsibility (and risk) for the successful development of the system from the client organisation to the vendor(s). In exchange for assuming the risk of contracting to deliver the desired solution on time and within budget, the integrator receives not only project management fees from the client but also markups from subcontractors.

Exhibit IV-29 enumerates the component products and services that may be a part of a systems integration project and from which the vendor can expect to receive revenue. Each project's unique requirements dictate which of these components are applicable to the project and the proportion of the total project expenditures to be made for each component involved.

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EXHIBIT IV-29

PRODUCTS/SERVICES IN SI PROJECTS

- Equipment/Hardware
  - Information Systems
  - Communications
- Software Products
  - Systems Software
  - Applications Software
- Professional Services
  - Consulting
    - Feasibility and Tradeoff Studies
    - Selection of Hardware, Network, and Software
  - Project Management
  - Design/Integration
    - Systems Design
    - Installation of Hardware, Network, and Software
    - Demonstration and Testing
  - Software Development
    - Modification of Software Packages
    - Modification of Existing Software
    - Custom Development of Software
  - Education/Training and Documentation
  - Operation and Maintenance
- Other Miscellaneous Products/Services
  - Data Processing Supplies
  - Processing/Network Services
  - Data/Voice Communication Services

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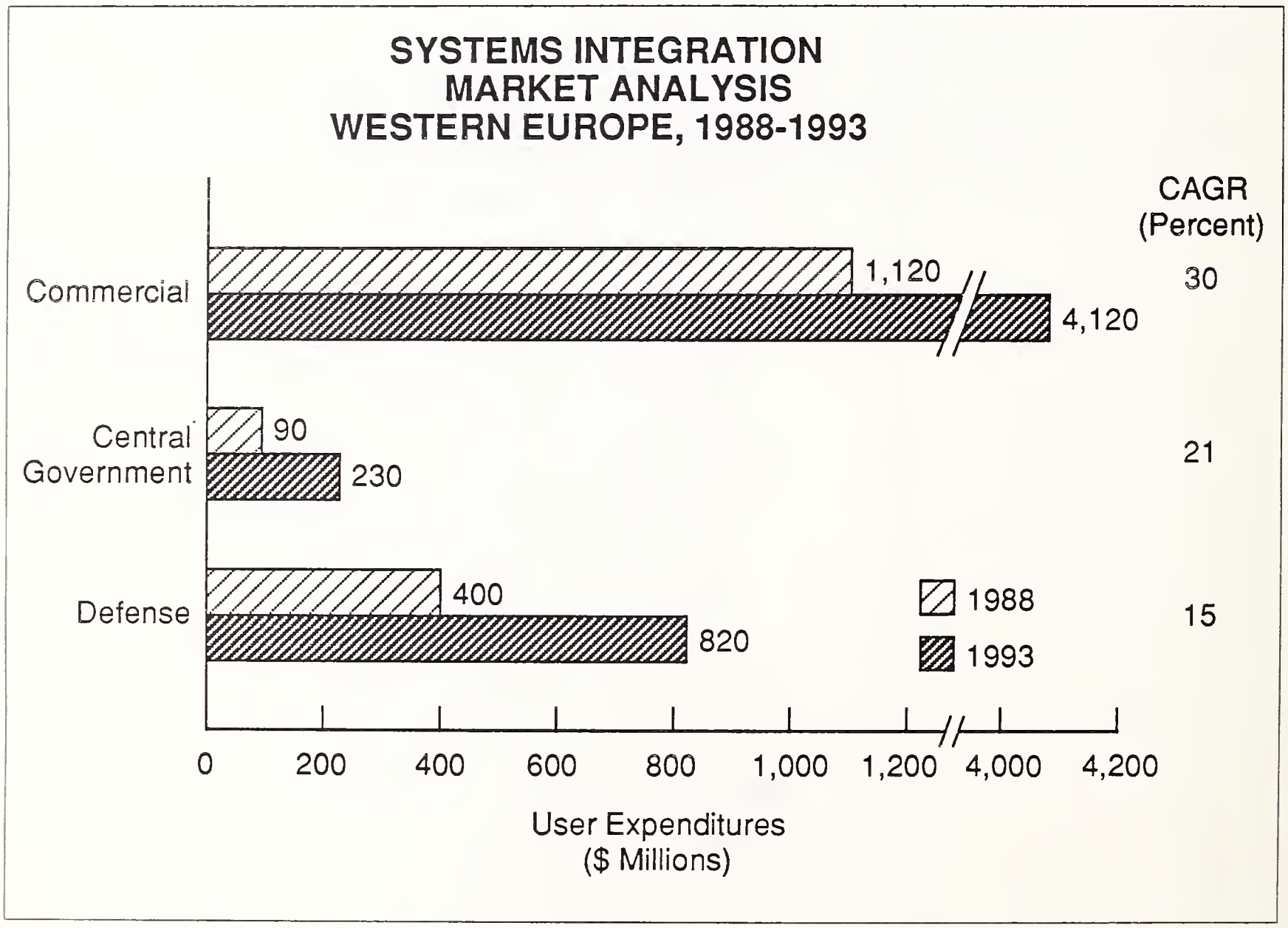
2. Market Size and Growth, 1988-1993

This overall market for systems integration can be analysed into three broad constituent parts: commercial, central government and defense. Exhibit IV-30 shows the analysis of these three subsegments for both 1988 and 1993. INPUT is anticipating much higher growth in the commercial sector than in the other two areas, as can be clearly seen from this exhibit. A more detailed analysis of the commercial sector is provided in INPUT's report *Commercial Systems Integration—Western Europe, 1988-1993* (December 1988).

EXHIBIT IV-30



Forecasts of the Western European systems integration market by principal subsector and by country markets are provided in Exhibits IV-31 and IV-32 respectively.

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Exhibit IV-31, showing the principal subsector analysis, clearly illustrates that system hardware and professional services are the dominant sectors of the market. It is important to understand that this macro analysis does not reflect average or median profiles for systems integration projects in general. There is no such thing as an average or typical systems integration project. Considerable disparity exists between the projects undertaken in different sectors and by different types of vendors.

EXHIBIT IV-31

SYSTEMS INTEGRATION MARKET FORECAST, 1988-1993 WESTERN EUROPE

Subsector	Market Forecast ($ Millions)			
	1987	1988	1988-1993 CAGR (Percent)	1993
System Hardware	580	715	22	1,910
Professional Services	585	770	30	2,860
Software Products	65	80	29	290
Other Services	40	45	20	110
Total	1,270	1,610	26	5,170

The highest growth subsectors of the systems integration market forecast are professional services and software products. The principal reasons for this are the declining prices of hardware components and the increasing complexity of systems and the consequent software development and management inputs that will be required. It can be expected that increasingly standard software components (products) will be utilised in order to minimise development time, but considerable human resources will still be required in order to integrate the components into a working system.

Another important consideration is the changing types of likely systems integration projects. INPUT has identified three principal categories of systems integration projects:

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- Technology-based projects
- Applications projects
- Data-oriented projects

Currently the most prominent group is technology-based projects. These projects require the integration of computer systems with some other technology, e.g., factory automation, materials handling or telecommunications. The special demands of these technologies require a contractor to assume overall responsibility for the integration task.

Application projects are less prevalent in the current marketplace since this is the area that meets the greatest reaction from traditional attitudes towards in-house information systems development. Further, the very real difficulties of defining most applications, particularly large and complex ones, have restricted a more widespread adoption of the systems integration approach.

Essentially the data-oriented project category is a future opportunity expected to develop over the next five years. Data-oriented projects involved the development of an overall data base structure for an organisation. This structure will enable the organization to link its existing 'islands of automation' and to make available the data and information stored, but currently inaccessible, within disparate data processing systems.

INPUT projects that over the next five years the market for systems integration projects will change. The overall proportion of technology projects will fall, whilst application-based projects will steadily increase and data-oriented projects will go through high growth as they emerge onto the market.

Exhibit IV-32, showing the country market analysis for Western Europe, identifies France, West Germany, the United Kingdom and Italy as the principal markets for systems integration within Western Europe. The largest of these is the United Kingdom where the influence of U.S.-based vendors has been most strongly felt in promoting the concept and where the deregulated political environment has created greater opportunities for systems integration.

In INPUT's previous report in this series, *The Western European Market for Information Services—Analysis and Forecasts, 1987-1992* (December 1987) an analysis was provided of the estimated systems integration market size for contract values below and in excess of $5 million in value. At the time this analysis was made, there existed some debate as to the appropriate price-break at which, in general terms, projects should be considered for inclusion within the sector. INPUT, in discussion with its clients, concluded that there is now general acceptance that the price-

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EXHIBIT IV-32

SYSTEMS INTEGRATION COMPARATIVE COUNTRY MARKETS WESTERN EUROPE

Country	Market Forecast ($ Millions)			
	1987	1988	1988-1993 CAGR (Percent)	1993
France	283	350	28	1,185
West Germany	298	380	26	1,230
United Kingdom	345	430	24	1,290
Italy	124	150	28	520
Sweden	25	30	27	100
Denmark	17	20	24	60
Norway	13	17	20	40
Finland	7	9	33	40
Netherlands	47	62	25	185
Belgium	39	53	23	155
Spain	25	40	26	145
Switzerland	25	35	28	115
Austria	11	15	28	50
Rest of Europe	11	12	23	50
Total (rounded)	1,270	1,610	26	5,170

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break for this sector can be realistically placed at around the $1 million level. Consequently, the analysis of project value between the groups below and in excess of $5 million is no longer shown.

3. Market Dynamics

The driving forces of the the systems integration market can be considered as the most extreme manifestation of the fundamental growth factors of the entire information systems business. These forces can be summarised under three headings:

- Technological drivers
- System management drivers
- Business/commercial drivers

Computer technology's rapid development and convergence with other technologies, most notably communications, has created the need for very large and complex systems development.

These large and complex systems in turn create the need for enhanced system management skills and capabilities if they are to be successfully developed and applied. Enhanced system management skills are frequently not available in sufficient quantity, and in some cases not at all, within user organisations. Consequently, there is a need for service solutions to overcome these internal shortages.

The general development of 'high-technology' industries within the advanced economies is also changing irrevocably the environment within which business, commerce and administration operate. Improved and very rapid communication capability for voice, data and images breaks down the need for large hierarchical and heavily integrated organisations. In their place are evolving more flexible and more rapidly changing groupings. This trend is evident within the economic environment as a whole, for example the greater use of subcontractors and the development of smaller firms whose product/service life cycles may be relatively short in traditional terms.

The need to adapt and evolve an organisation's business in response to this challenge implies the need to utilise information systems both extensively and innovatively. This need will increasingly be met through the medium of systems integration contracting.

4. Competitive Environment

The classification of the systems integration sector brings together a wide variety of different types of vendors. Exhibit IV-33 shows a listing of the top ten ranked vendors in this sector identified by INPUT. In gen-

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EXHIBIT IV-33

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
SYSTEMS INTEGRATION
WESTERN EUROPE

Rank	Company	Market Share (Percent)	Estimated Revenues ($ Millions)
1	IBM	12.5	160
2	CGS/SESA	11.8	150
3	Andersen Consulting	7.1	90
4	Siemens	6.3	80
5	Scicon	3.9	50
6	Unisys	3.1	40
7	Logica	3.1	40
8	Digital	2.0	25
9	Olivetti	2.0	25
10	CAP Group PLC	1.8	23
	Others	46.4	587
	Total Market	100.0	1,270

eral, participating vendors can be grouped into the following classifications:

- Computer equipment vendors
- Professional services vendors
- Electronic engineering companies
- Telecommunications equipment vendors
- Other vendors

Computer equipment vendors are strongly represented in this sector, with IBM as the market leader and with Unisys, Digital and Olivetti featured

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in the top ten. Computer equipment vendors have been increasingly drawn into this business as a result of customer demand for system solutions rather than only equipment. Although a number of vendors have been active in the systems integration field for a number of years, the opportunity now emerging for this form of solution delivery is causing the setup of specific systems integration groups and marketing initiatives.

The professional services vendors also have a very strong presence in this market sector. The combined revenues of CGS and SESA put them clearly in second position just below IBM. Other significant participants are Andersen Consulting, Scicon (now part of the SD-Scicon group), Logica and CAP Group PLC (now the SEMA Group). Professional services companies have long been developing their skills and have traditionally shown a preparedness to assume the responsibility for project development and implementation.

The professional services vendors are particularly strong in the commercial systems integration sector in 1988 with CGS/SESA in second place.

Other market participants include the large electronic engineering companies often strong in the defense sector; for example organisations such as Siemens, Ferranti, Thompson and GEC. The telecommunications equipment organisations include companies such as RACAL, Alcatel and GPT (GEC Plessey Telecommunications). In addition to these groupings, the systems integration market is also attracting interest from organisations in fields such as aerospace, public telephone service providers and software products companies.

F

Turnkey Systems

1. Market Overview and Structure

The turnkey systems market was valued at $6.9 billion for Western Europe in 1987 and is expected to reach $8.2 billion in 1988. This represents a growth rate of 19%. As can be seen in Exhibit IV-34, INPUT forecasts that growth in this market sector will continue at a compound annual rate of 17%. The market is forecast to reach a total of $18.2 billion by 1993.

The turnkey systems sector represents 19% of the overall Western European software and services market, in contrast to the United States, where it is 14% of the total market. Expected growth in Europe is higher at 17% per annum compared to the U.S., where forecast growth is estimated at 11% CAGR.

Whilst 'turnkey systems' is a term that INPUT is now using for the sector designated 'integrated systems' or 'standard turnkey systems' in previous reports, there has been no change in the definition of this sector.

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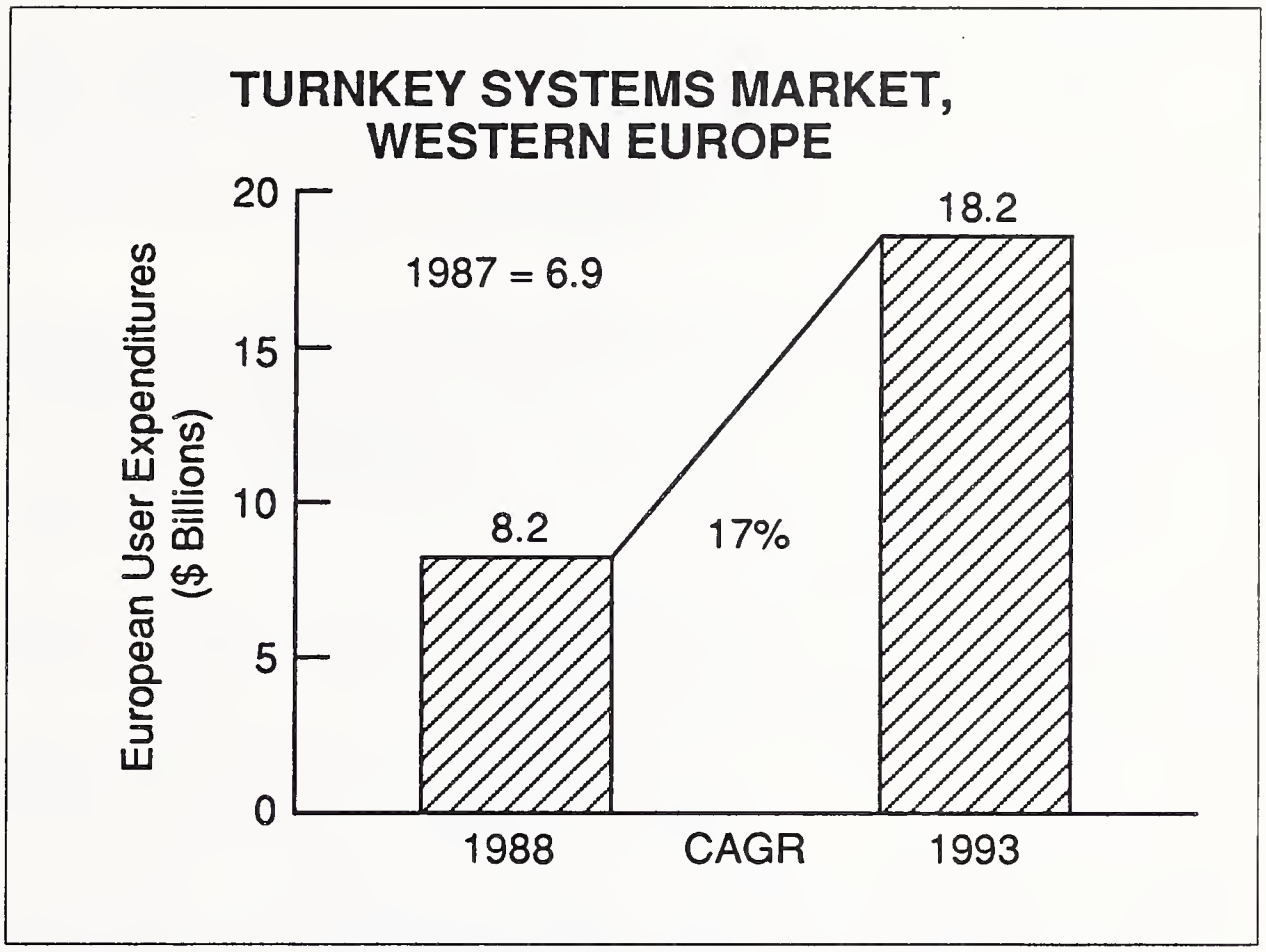
EXHIBIT IV-34



However, the widespread use of the term 'systems integration' for very large one-off system development projects implies the need for a distinct identity for this market sector.

The turnkey systems market is distinctly different from the systems integration market where the service offering is specifically designed and implemented for one single customer; turnkey systems are offerings that are intended to be sold to a number of customers.

The systems integration market is discussed in Section IV/E, whilst INPUT's 1988 report *Commercial Systems Integration in Western Europe* provides a detailed examination of this market.

INPUT defines the turnkey systems market as consisting of service products where the vendor has undertaken, prior to delivery to the customer, an integration of systems and applications software with hardware, packaged as a single entity. In general the value added by the vendor is primarily in the software. Most CAD/CAM systems and many small business systems are turnkey systems. This category however excludes specialised hardware systems such as word processors, cash registers, and process control systems.

The structure of the turnkey systems market can be considered as consisting of three broad groups:

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- The CAD/CAM market
- The small-to-medium-sized business systems market
- Specialist vertical or niche markets; for example production control and project management

The turnkey systems market has developed largely from the small- to medium-sized business category. The rapid proliferation of low-cost hardware, initially minis and subsequently micros and super micros, has widened this market extensively.

2. Market Dynamics

The turnkey market is being driven by a number of significant factors. The principal ones are:

- The availability of improved microcomputer technology bringing significantly more processing power per hardware unit cost
- The appeal of a complete hardware/software system over which the end user has direct control is strong in an age of ever-increasing end-user expectation for a total solution, ease-of-use features and on going support services
- The availability of 'supermini' and 'supermicro' hardware systems is increasingly widening the potential range and scope of turnkey system offerings. Minicomputer equipment, for example, has become powerful enough to challenge the functionality of mainframe systems. Thus departmental turnkey systems can to some extent replace the need for large-scale centralized corporate systems.

Increasingly smaller manufacturers are finding that the in-house development of 'unique' hardware and software systems is becoming prohibitively expensive. However, at the same time, they are finding that standard, off-the-shelf hardware systems are increasingly available across a wide range of specifications. This is coupled with the emergence of 'standard' software systems, notably UNIX, that enable an independent vendor to build a business based on bought-in systems without the necessity of being inextricably tied in with the hardware supplier.

Whilst debates about the individual merits of UNIX and PICK as software systems are fashionable, and much hype is uttered around concepts such as 'portability', these technical discussions are largely irrelevant to the real commercial decisions that small systems suppliers must face. These decisions relate very strongly to the second major factor outlined above; the end-user expectation for comprehensive and easy-to-use 'total' solutions.

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The smaller independent vendor is faced with the challenge of maintaining state-of-the-art capability with limited research and development funding. It must provide a system with not only a prime application capability, but also supported by accepted generic applications such as electronic mail, word processing, spreadsheets and desktop publishing.

The appeal of UNIX to such vendors is not any inherent advantage in UNIX as a software system, but the body of software that instantly become available for use on that system—software for which additional conversion and adaptation costs are not incurred. The combination of these readily available software components and low-cost but powerful standard hardware subsystems allows a vendor to concentrate scarce development resources on the main application target for a turnkey system. The implication of this is that the turnkey vendor can understand and focus on clearly defined target market areas, develop the specialisation that differentiates the vendor in that marketplace and provide the total service support package that enables the vendor to control the distribution channel (i.e. customer loyalty).

All of this is summarised in reference to Exhibit IV-35, which provides a schematic representation of a turnkey system. This diagram is intended to represent the principal components that vendors must consider combining when designing their products. Clearly the greater number of these components that can be obtained and incorporated into the system without expensive adaptation, the more competitive that vendor can be in terms of the features, value and price.

The vendor also has the overriding advantage of being able to maintain a great deal of flexibility in respect to the sourcing of these hardware and software components.

However it is also important to note that not only smaller hardware vendors or independent system vendors are adopting the 'turnkey system' approach to meeting market needs. Large manufacturers have demonstrated that the need to respond quickly to product gaps or new opportunity areas may be met through third-party sourcing of systems. For example, IBM has gone to Stratus in order to offer fault tolerant systems, and Unisys to a number of suppliers (e.g. NCR) in order to offer an integrated line of small (UNIX-based) systems.

For manufacturers a second major area of interest in turnkey systems is the distribution channels for their products. One of the key areas of uncertainty for the computer industry is the ever-changing nature of third-party distribution channels. The industry is still attempting to evolve a system of stable and accepted relationships between different parties in the distribution chain. Manufacturer policy on this is beset by short-term profit goals interfering with the establishment of long-term commercial relationships.

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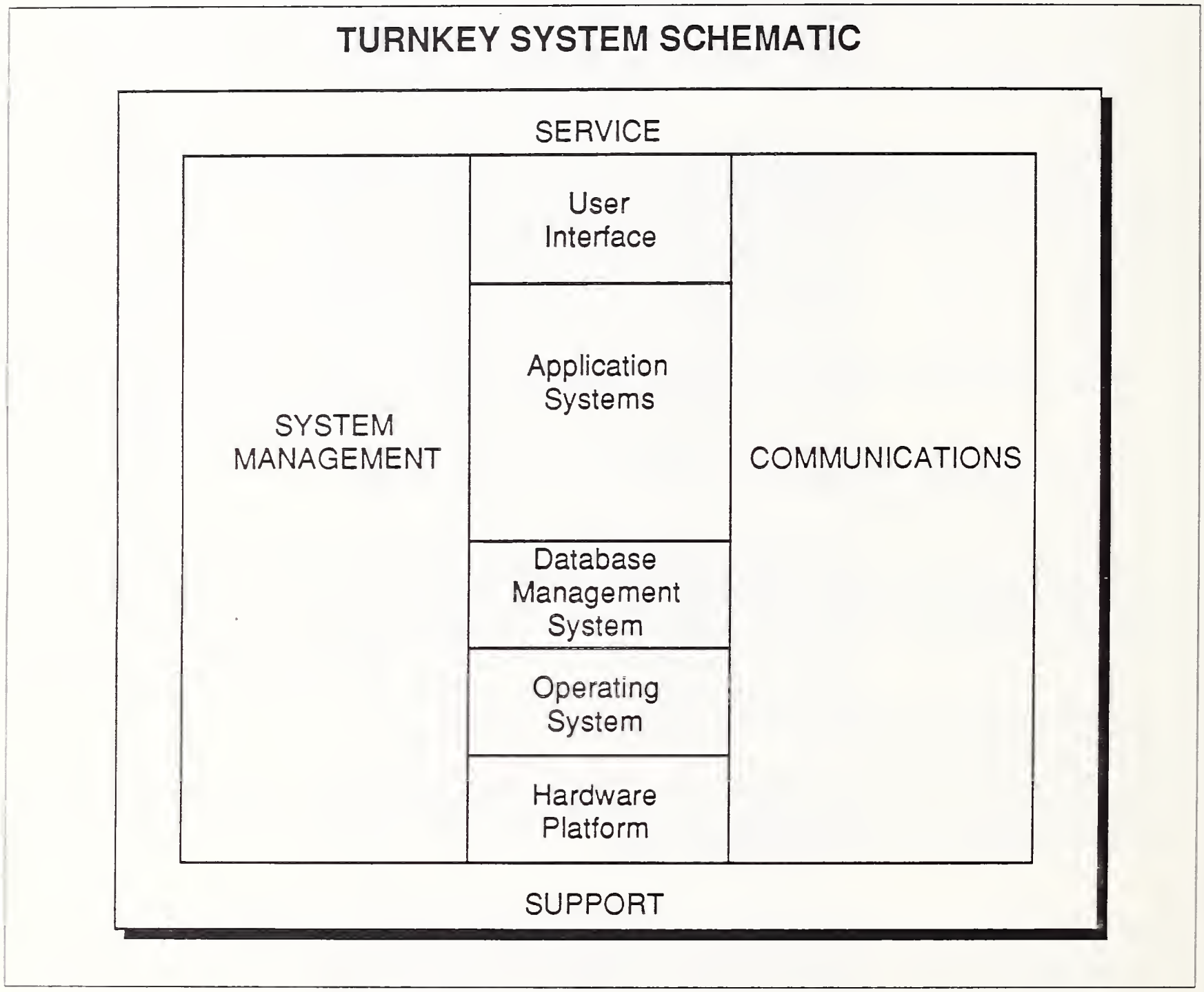
EXHIBIT IV-35



3. Market Size and Growth, 1988-1993

Exhibits IV-36 and IV-37 provide summary tables of INPUT's market forecast for the turnkey sector. Exhibit IV-36 shows the overall total market size for Western Europe and Exhibit IV-34 provides a comparative country market analysis, both in U.S. dollars.

As can be seen from Exhibit IV-33, INPUT has assessed this market sector as being worth about $6.9 billion in 1987 growing to over $8.2 billion in 1988, representing growth of about 19%. INPUT forecasts that the growth will slow to an average annual rate of about 17% resulting in a market size of $18.2 billion by 1993.

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Exhibit IV-36 depicts an analysis of the growth rates of the total sector for Western Europe, between the hardware element and the software and 'other' component. It can be seen clearly that the rate of growth of the hardware element is overall lower than that of the software and 'other' components, but also that it is expected to fall at a faster rate. In consequence, whereas today hardware is still forming approximately one-half of the total package cost to the end user, by 1993 it is expected to represent just over 40%.

EXHIBIT IV-36

TURNKEY SYSTEMS MARKET FORECAST, 1988-1993 WESTERN EUROPE

Subsector	Market Forecast ($ Millions)			
	1987	1988	1988-1993 CAGR (Percent)	1993
System Hardware	3,520	4,040	13	7,330
Software and Other Charges	3,340	4,140	21	10,900
Total	6,860	8,180	17	18,230

The two main causes of this proportional change are the falling cost/power ratio of computer equipment in general and the greater emphasis on a richer and more extensive software environment for the customer. Clearly the greater opportunities for the vendor to 'add value' lie in the software and services component.

Reference to Exhibit IV-37 shows that the highest expected rates of growth are anticipated in the Italian and Spanish markets and in the 'rest of Europe' sector.

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EXHIBIT IV-37

TURNKEY SYSTEMS
COMPARATIVE COUNTRY MARKETS
WESTERN EUROPE

Country	Market Forecast ($ Millions)			
	1987	1988	1988-1993 CAGR (Percent)	1993
France	1,500	1,770	17	3,860
West Germany	1,503	1,781	17	3,840
United Kingdom	1,153	1,369	17	3,020
Italy	862	1,052	20	2,640
Sweden	216	258	17	570
Denmark	165	197	17	430
Norway	134	157	16	330
Finland	122	147	17	330
Netherlands	378	448	16	940
Belgium	212	253	16	540
Spain	198	243	21	630
Switzerland	238	284	17	620
Austria	116	138	17	300
Rest of Europe	67	82	19	200
Total	6,860	8,180	17	18,230

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4. Competitive Analysis

Exhibit IV-38 shows the ranking of the leading turnkey system vendors in Western Europe in 1987. It is noticeable that the CAD/CAM vendors occupy an important position in this table, with Computervision, Prime, and Intergraph all in the top ten.

EXHIBIT IV-38

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
TURNKEY SYSTEMS
WESTERN EUROPE

Rank	Company	Market Share (Percent)	Estimated Revenues ($ Millions)
1	Nixdorf	10.0	820
2	Mannesman Kienzle	5.7	470
3	Unisys	2.0	165
4	Olivetti	1.9	155
5	Computervision	1.8	150
6	Prime	1.2	100
7	Norsk Data	1.1	90
8	McDonnell Douglas	1.1	90
9	Intergraph	1.0	85
10	Hoskyns	0.6	46
	Others	73.6	6,014
	Total	100.0	8,185

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V

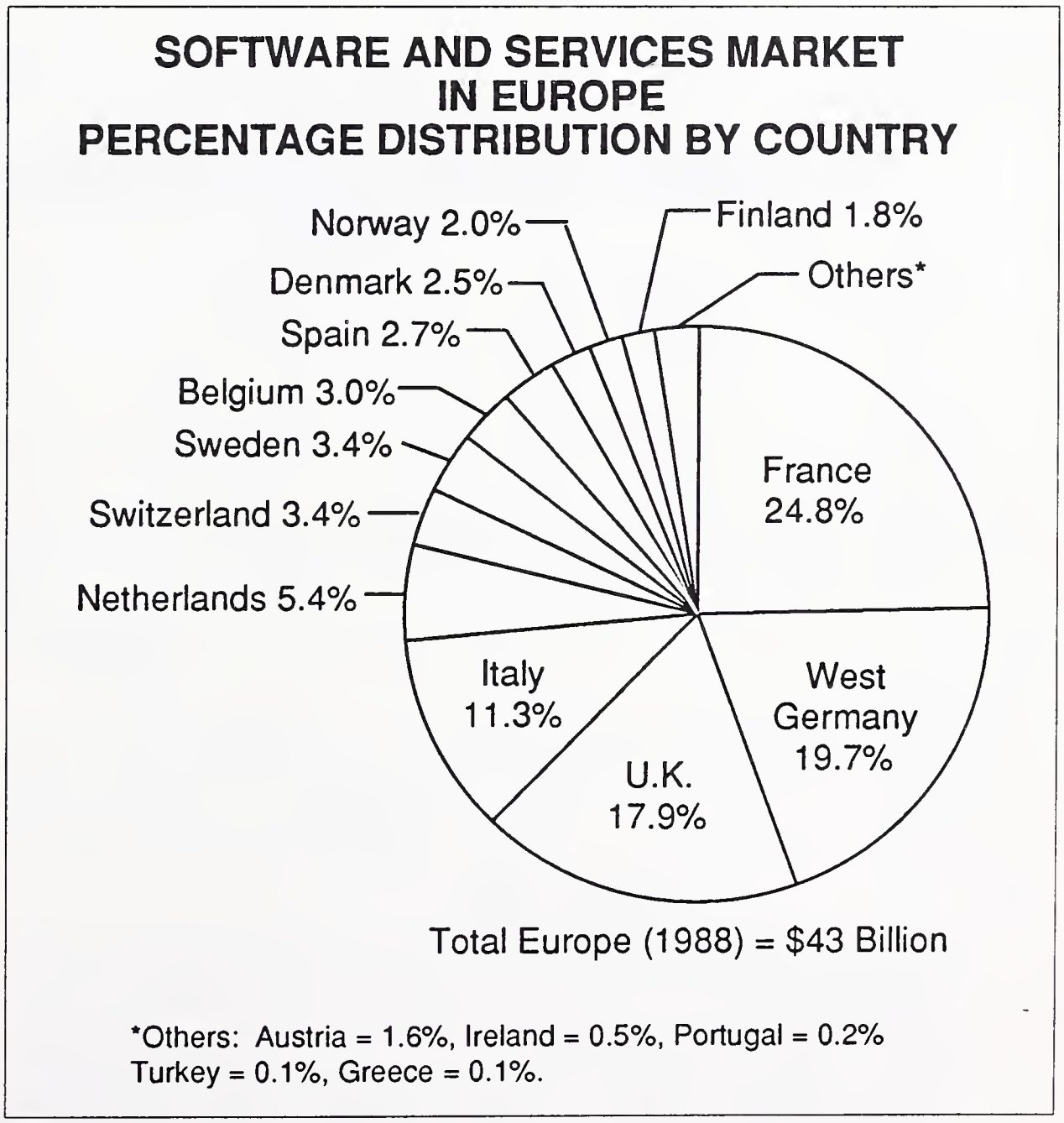
Country Market Analysis

V

Country Market Analysis

Exhibit V-1 illustrates the percentage distribution of software and services end-user expenditures by country market for 1988.

EXHIBIT V-1



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France is the largest market in Western Europe, followed by West Germany, the United Kingdom and Italy. These four markets together account for almost three-quarters of the total Western European market.

A

France—Market Commentary

1. General Introduction

INPUT estimates that the software and services market in France was FF 54510 million ($8890 million) in 1987. France therefore stands as the largest country market in Western Europe, holding 25% of the total market. This represents some 7.4% of the worldwide market of $120 billion. Comparative country market estimates are shown in Exhibit III-13, earlier in this report.

Exhibit V-2 illustrates INPUT's tracking of the French market growth since 1978. The average annual growth from 1978 to 1987 was about 27%. Exhibit V-3 shows INPUT's analysis of the industry market sectors for France.

EXHIBIT V-2

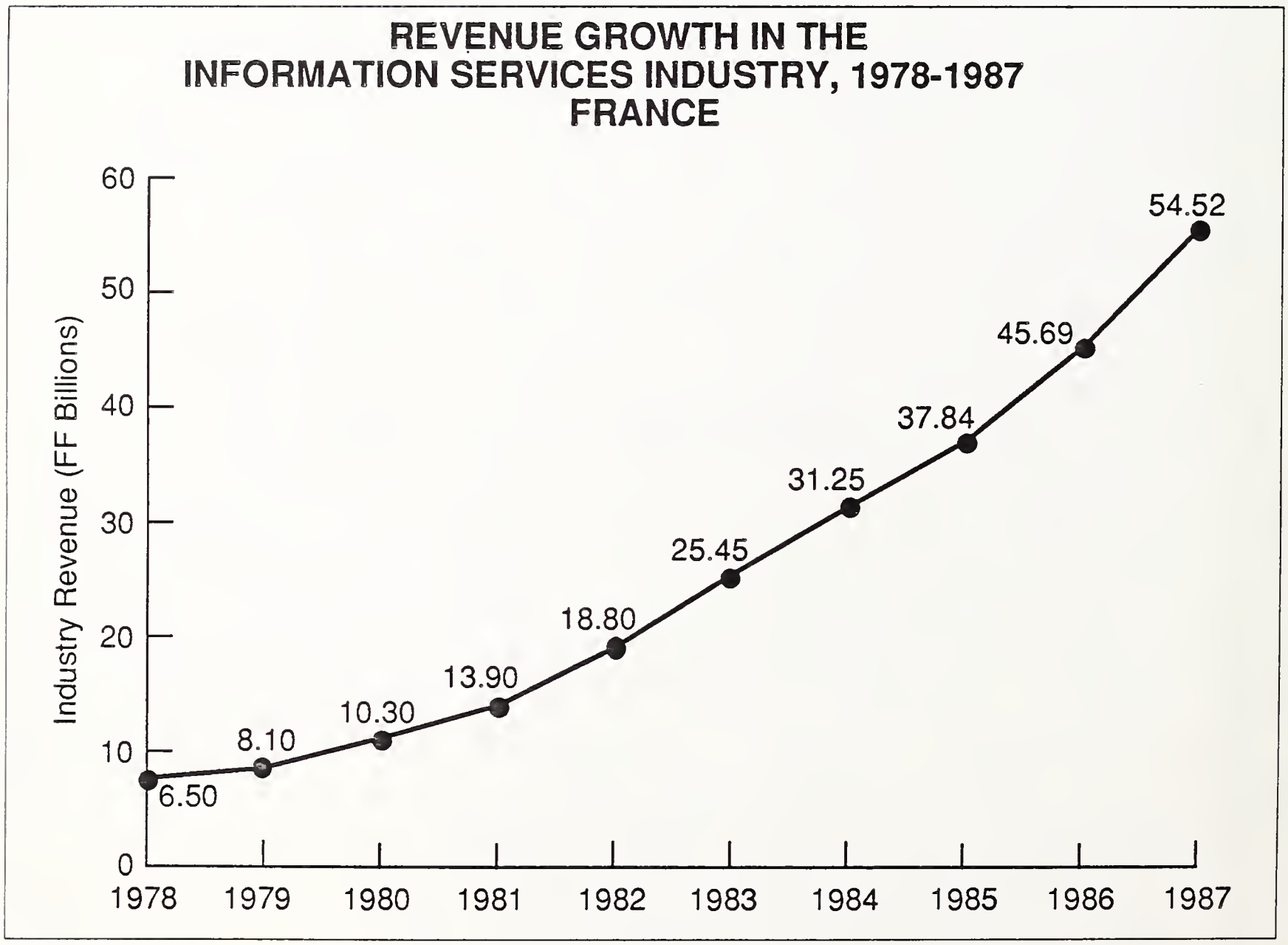

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EXHIBIT V-3

COMPUTER SOFTWARE AND SERVICES INDUSTRY MARKET ANALYSIS, 1988 FRANCE

Industry Sector	Market Size (FF Millions)	Percent of Total
Manufacturing		
- Discrete	13,100	20.2
- Process	5,850	9.0
Distribution (Retail & Wholesale)	5,520	8.5
Transportation	2,730	4.2
Utilities	2,860	4.4
Banking & Finance	13,450	20.7
Insurance	4,670	7.2
Government		
- National	5,260	8.1
- Local	3,960	6.1
Services	5,460	8.4
Other	2,080	3.2
Total	64,940	100.0

The average annual growth rate for the five-year period from 1988 to 1993 is expected to fall to around 18%.

2. Economic Environment

The new French Government (made up of the Socialists, with some backing from the centre parties) inherited a slow-growing economy showing some signs of improvement. The new administration has left the budget proposals of the last government largely unchanged, aiming to reduce the budget deficit to 2% of GDP whilst reducing both direct and indirect taxation.

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Economic growth in the first quarter of 1988 was considerably above expectations, with the economy expanding at an annualised rate of nearly 4%. Although some slowdown in growth is envisaged in the latter part of the year, the economy is forecast to grow by just over 2.5% in 1988. In 1989 the pace of economic growth will slow to around 2%, the main cause being, both in 1988 and 1989, a downturn in domestic demand.

The very favourable trend in company profits seen over the past year is expected to continue. This should help to underpin company investment for the remainder of this year. The slowdown in domestic demand in 1989 will also impact on investment spending by the corporate sector.

The Bank of France's intervention rates have been cut from 8% to 6.75%. The scope for further cuts in interest rates is now very limited given the general upward trend in rates worldwide and the pressure likely to be generated within the EMS by a falling dollar later in the year.

3. Software and Services Industry Commentary

The French market is forecasted by INPUT to grow from FF64.9 billion ($10.6 billion) in 1988 to reach FF150 billion ($24.5 billion) by 1993. This five-year forecast reflects an compound annual growth rate for the period 1988 to 1993 of approximately 18%.

Exhibit V-4 illustrates these figures and gives the individual compound annual growth rates and market sizes of the six distinct market sectors identified, over the same period.

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EXHIBIT V-4

SOFTWARE AND SERVICES MARKET FORECAST, 1988-1993 FRANCE

Subsector	Market Forecast (FF Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Processing Services	10,500	11,010	4	13,200
Network Services	1,380	1,900	26	6,140
Software Products	12,580	15,670	22	41,720
Professional Services	19,120	23,360	20	58,180
Systems Integration	1,735	2,150	28	7,260
Turnkey Systems	9,195	10,850	17	23,650
Total	54,510	64,940	18	150,150

INPUT's forecasts for the individual sectors of the French information services market are given in Exhibits V-5 to V-9.

The growth rate for processing services in France is forecast to be 5% for 1987 to 1988, falling to 4% per annum for the period 1988 to 1993.

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EXHIBIT V-5

PROCESSING SERVICES MARKET FORECAST, 1988-1993 FRANCE

Subsector	Market Forecast (FF Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Transaction, Utility and Other Services	9,770	10,160	2	11,440
Facilities Management	730	855	16	1,760
Total	10,500	11,015	4	13,200

Network services, now separated from processing services, show an initial market surge in the growth rate of 38% for the period 1987 to 1988. This is estimated to reduce to a more modest average annual growth rate of 26% between 1988 and 1993. Despite these relative high growth rates this market segment is estimated to amount to only 4%, as opposed to the processing services' 9% of the market share in 1993.

For a more detailed analysis of the network services industry in France, the interested reader is recommended to read INPUT's 1988 report entitled *Network Services—Western European Market Opportunities, 1988-1993*.

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EXHIBIT V-6

NETWORK SERVICES MARKET FORECAST, 1988-1993 FRANCE

Network Services	Market Forecast (FF Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Managed Network Services	50	80	36	380
Network Applications	800	1,120	28	3,920
Electronic Information Services	530	700	21	1,840
Total	1,380	1,900	26	6,140

INPUT estimates that the software products sector expanded at a growth rate of 25% from 1987 to 1988. The five-year projection shows a reduction in the growth rate to 22% per annum for the period 1988 to 1993. Events have confirmed INPUT's assessment in 1987 that the hardware manufacturers would be taking an increasing role in this market.

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EXHIBIT V-7

SOFTWARE PRODUCTS MARKET FORECAST, 1988-1993 FRANCE

Subsector	Market Forecast (FF Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Hardware Manufacturers				
Systems	6,330	7,820	21	20,100
Applications	1,050	1,320	23	3,680
Subtotal	7,380	9,140	22	23,780
Independents				
Systems	1,800	2,250	22	6,080
Applications	3,400	4,250	23	11,860
Subtotal	5,200	6,530	22	17,940
Total Market				
Systems	8,130	10,070	21	26,180
Applications	4,450	5,600	23	15,540
Total	12,580	15,670	22	41,720

A similar compound annual growth rate pattern of reducing percentages is predicted by INPUT in the professional services market. The growth for the period 1987 to 1988 is 22%, whilst CAGR for 1988 to 1993 is estimated at 20%.

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EXHIBIT V-8

PROFESSIONAL SERVICES MARKET FORECAST, 1988-1993 FRANCE

Subsector	Market Forecast (FF Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
IS Consultancy	2,050	2,540	22	6,980
Custom Software Development	15,300	18,670	20	46,050
Education and Training	1,600	1,950	19	4,650
Facilities Management	170	200	20	500
Total	19,120	23,360	20	58,180

As a reflection of the growing international interest in systems integration projects, INPUT has now shown this as a separate market sector. Accepting the statistical ambiguities of a 'population' of a relatively few but high value projects, the estimates given show the high compound annual growth rate typical of many nascent markets.

The predicted growth rate for systems integration is 23% for the period 1987 to 1988 and 28% from 1988 to 1993. The overall size of this market segment is however, relatively small, representing only an estimated 3% of the total software and services market in 1988, rising to a figure of 5% in 1993.

In line with the generally predicted trend in the market, turnkey systems are estimated by INPUT to merit growth of 18% from 1987 to 1988, reducing to 17% annually between 1988 and 1993.

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EXHIBIT V-9

TURNKEY SYSTEMS
MARKET FORECAST, 1988-1993
FRANCE

Subsector	Market Forecast (FF Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
System Hardware	5,090	5,800	13	10,500
Software and Other Charges	4,105	5,050	21	13,150
Total	9,195	10,850	17	23,650

4. Competitive Environment

Exhibits V-10 to V-15 illustrate INPUT's rankings and market shares of leading independent vendors operating in the French market. Exhibit V-10 shows the top thirty overall in the software and services market. Exhibits V-11 to V-15 give the ten leading companies in respectively, the processing services, software products, professional services, systems integration and turnkey markets.

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EXHIBIT V-10

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
SOFTWARE AND SERVICES
FRANCE

Rank	Company	Market Share (Percent)	Estimated Revenues (FF Millions)
1	IBM	5.6	3,050
2	Transpac	3.9	2,185
3	Cap Gemini Sogeti	3.1	1,755
4	Sligos	2.4	1,340
5	Nixdorf	2.0	1,100
6	GSI	1.7	960
7	Telesystemes	1.7	940
8	CISI	1.6	920
9	CCMC	1.5	850
10	Bull	1.4	765
11	Unisys	1.4	760
12	Sema Metra	1.3	710
13	SG2	1.2	690
14	Steria	1.0	550
15	Digital	0.8	460
16	GFI	0.8	455
17	Sodinforg	0.8	445
18	CGI	0.8	440
19	Syseca	0.8	440
20	Asystel	0.8	420
21	SITB	0.7	380
22	Sopra	0.7	380
23	Mannesman-Kienzle	0.6	330
24	Segin	0.6	320
25	Andersen Consulting	0.6	310
26	Sinorg	0.5	305
27	TITN	0.5	300
28	Computer Associates	0.5	295
29	CDFI	0.5	288
30	CMG	0.5	285
	Others	58.9	32,092
	Total Market	100.0	54,520

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EXHIBIT V-11

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
PROCESSING SERVICES
FRANCE

Rank	Company	Market Share (Percent)	Estimated Revenues (FF Millions)
1	Transpac	18.5	1,940
2	CCMC	5.8	615
3	Sligos	5.1	540
4	SG2	3.2	335
5	GSI	3.1	325
6	Sodinforg	2.8	290
7	Segin	2.7	280
8	CISI	2.5	260
9	GFI	2.4	255
10	SITB	2.0	215
	Others	51.9	5,445
	Total Market	100.0	10,500

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EXHIBIT V-12

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
SOFTWARE PRODUCTS
FRANCE

Rank	Company	Market Share (Percent)	Estimated Revenues (FF Millions)
1	IBM	14.6	1,840
2	Bull	3.7	460
3	Computer Associates	2.3	295
4	Unisys	2.2	275
5	Microsoft	1.8	230
6	GSI	1.8	225
7	Digital	1.5	185
8	La Commande Electronique	1.2	150
9	CGI	1.1	135
10	Thom 6	1.0	125
	Others	68.8	8,660
	Total Market	100.0	12,580

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EXHIBIT V-13

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
PROFESSIONAL SERVICES
FRANCE

Rank	Company	Market Share (Percent)	Estimated Revenues (FF Millions)
1	Cap Gemini Sogeti	7.0	1,340
2	CISI	3.2	620
3	Sema Metra	2.8	530
4	IBM	2.6	490
5	Steria	2.5	470
6 =	Sligos	1.8	350
6 =	Telesystemes	1.8	350
8 =	Sopra	1.7	330
8 =	Syseca	1.7	330
10	SG2	1.5	290
	Others	73.3	14,020
	Total	100.0	19,120

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EXHIBIT V-14

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
SYSTEMS INTEGRATION
FRANCE

Rank	Company	Market Share (Percent)	Estimated Revenues (FF Millions)
1	Cap Gemini Sogeti*	20.7	360
2	IBM	14.1	245
3	SESA*	10.9	190
4	Thompson	8.6	150
5	Andersen Consulting	6.3	110
6	Sema Metra	5.8	100
6	Alcatel	3.4	60
8	Siemens	3.2	55
8	GFI	2.0	35
10	EDS	1.7	30
	Others	23.3	400
	Total	100.0	1,735

Cap Gemini Sogeti revenues include SESA's revenues for the last five months of the year. SESA's remaining revenues are shown separately.

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EXHIBIT V-15

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
TURNKEY SYSTEMS
FRANCE

Rank	Company	Market Share (Percent)	Estimated Revenues (FF Millions)
1	Nixdorf	10.9	1,000
2	Sligos	5.1	465
3	Mannesman-Kiengle	3.1	290
4	Unisys	2.2	200
5	CISI	2.2	200
6	McDonnell Douglas	1.7	160
7	Telesystemes	1.7	160
8	Cap Gemini Sogeti	1.6	150
9	Olivetti	1.5	135
10	Computervision	1.4	130
	Others	68.6	6,305
	Total	100.0	9,195

a. Recent Developments

Cap Gemini Sogeti's total revenues in 1987 increased by 44% to FF4175 million. Much of this growth is due to the inclusion of SESA's revenues for the last five months of the year (Cap Gemini's share in SESA increased from 42% to 93% on August 1st 1987). Without the contribution of SESA—about FF600 million—the year-on-year increase would have been around 23%.

Cap Gemini's 1987 results also include revenues from three companies acquired outside of France since the end of 1986—Ibat (West Germany),

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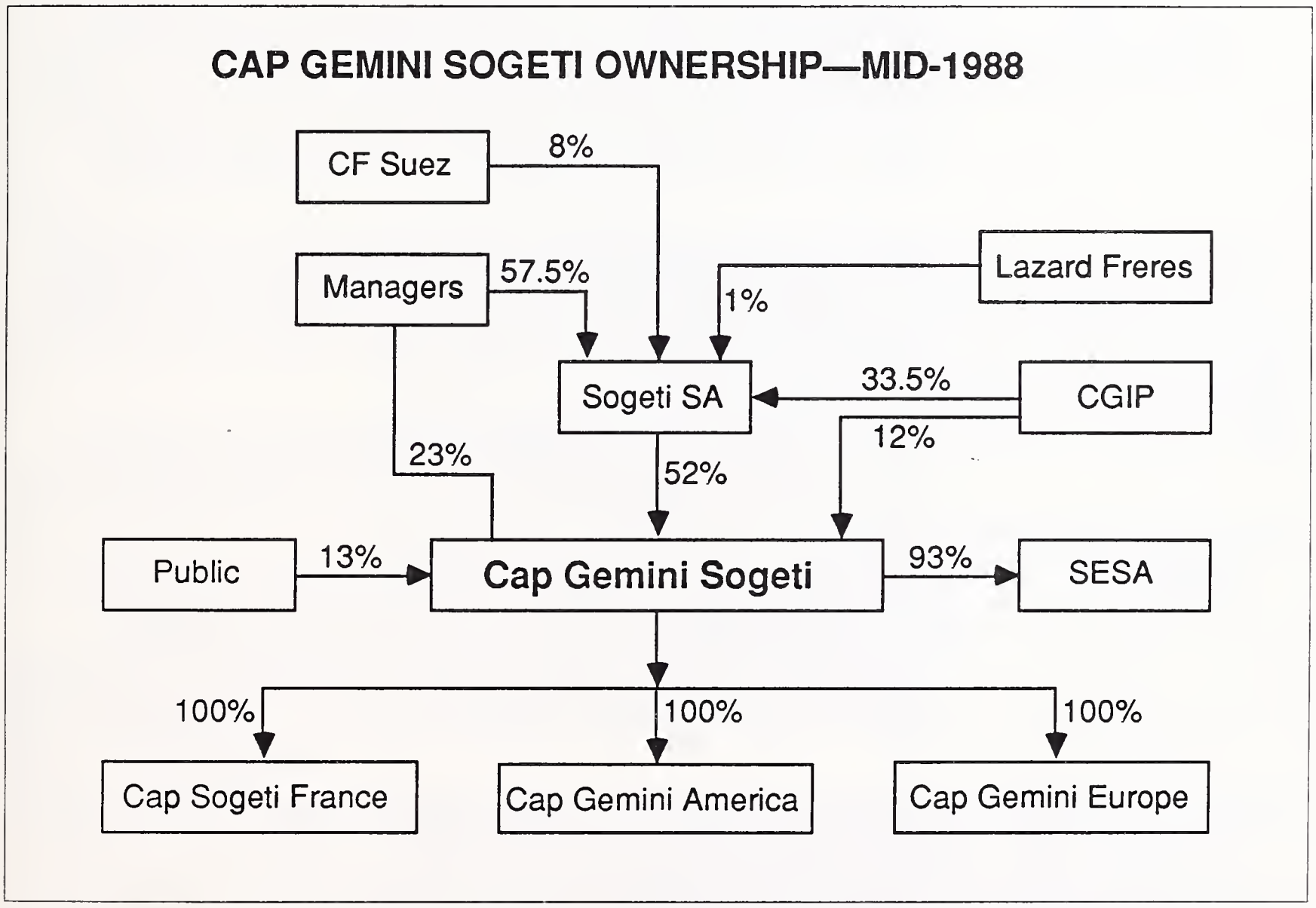
Ge-Da (Italy) and Sycomm Systems Corp (U.S.). In addition the company took a 36% interest in Cisi and an 80% share in another French company, Itmi. Cap Gemini also bought a sizeable stake in CAP Group in the U.K. (now part of the Sema Group).

Exhibit V-16 shows the ownership of Cap Gemini Sogeti's capital. Large shares are owned, directly and indirectly, by the company's managers and by CGIP (Compagnie Generale d'Industrie et de Participations). The finance company, Suez, also has a participation in the holding company. As of mid-1988, 13% of the shares were owned by the public.

EXHIBIT V-16



In May 1988, Sligos became the third SSII to be fully quoted on the French Bourse (i.e. the *Reglement Mensuel*), following Cap Gemini Sogeti and CCMC. 37% of Sligos' shares are now on the stock market. This was a logical move by Sligos, given the high volume of transactions involving their shares that was taking place and the high growth that is expected by the company (partly through acquisitions and joint ventures).

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In 1987, only 4% of Sligos' business was outside of France. This is expected to increase significantly over the next few years, as the company negotiates joint ventures abroad, notably in West Germany and Italy and particularly in the U.S., where arrangements appear to be quite advanced.

In November 1987, the employees of GSI took control of 70% of the company. (GSI was previously a subsidiary of Alcatel.) Since this change of ownership, GSI's main expansion move was the creation of two subsidiaries in West Germany in April 1988. They are called Danet-IS and GSI-Danet. These companies' activities will be mainly in the telecommunications area.

In March 1988, the French professional services company, Sema Metra, merged with CAP Group (U.K.). The new company is called Sema Group plc. The combined revenues of the two companies in 1987 was over $400 million. Most of this was derived from France and the U.K. However, Sema Metra also has significant revenues in Belgium and Spain, and CAP Group has an important Dutch subsidiary (CPP).

The other major merger in the European information services market in 1988 involved two British companies, Systems Designers and Scicon. This has significance for the French market since Scicon has a French subsidiary, GFI. GFI's revenues make up about 19% of the total of the new group (SD-Scicon).

Possibly the most important acquisition development involving two French companies that has taken place recently was the purchase by Concept SA of a controlling interest in its rival, CCMC, in August 1988.

This is particularly notable since Concept is a much smaller company than CCMC (its revenues on 1987 were FF195 million compared to CCMC's FF950 million). Their combined revenues for 1988 are expected to be in the region of FF1450 million. This figure is all the more remarkable considering Concept's turnover was only FF22 million in 1985.

Concept was formed in 1971. Until 1983 the company mainly supplied custom-built financial software. Concept's exponential growth started after it developed a range of standard financial software packages for microcomputers. One of CCMC's main areas of activity is also micro financial packages. Its other main business area is processing services.

b. High-Growth Companies

Two of the fastest-growing French companies are Sodinforg and Sinorg. Sodinforg's total revenues increased by 54% in 1987. Some of this is

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accounted for by acquisition, but organic growth was in the region of 40%. Sodinforg's main business is financial transaction processing (*Monetique*).

Sinorg's revenues grew by 186% between 1986 and 1987. The company's main activities are professional and processing services, with some software product business. Sinorg acquired G-Cam in 1987.

Most of the U.S.-owned software product companies operating in the French market increased significantly in 1987. The two main ones, Computer Associates and Microsoft, grew by 69% and 106% respectively.

The American 'Big Eight' accountancy firm, Arthur Andersen, also increased its total French revenues significantly (over 50%) in 1987. Most of the company's revenues are in the consultancy/professional services area and systems integration area. The rest of the company is now called Andersen Consulting.

c. Foreign Activities

A number of French companies (the most notable being Sema Metra and GSI) have Spanish subsidiaries. More and more companies are seeing the fast-growing Spanish market as a potential source of growth. Segin, for example, bought 70% of the capital of the Spanish company, Oda SA, a company specialising in financial software packages for minicomputers and mainframes. (Oda has 85 employees and expected revenues in 1988 of around $4 million.)

Canada is also considered by many French companies to be an attractive market. This is partly due to language reasons. Steria, for example, recently entered the Canadian market by taking a 50% stake in MBM Inc., a small software company based in Quebec.

B

West Germany—Market Commentary

1. General Introduction

INPUT estimates that the software and services market in West Germany was DM12,810 million ($7,040 million) in 1987. This market is therefore second only to France as the largest country market in Western Europe, holding nearly 20% of the total market. This represents some 6% of the worldwide market of $120 billion. Global software and services market estimates are shown in Exhibit III-13, earlier in this report.

Exhibit V-17 illustrates INPUT's tracking of the West German market growth curve from 1978 to 1987, showing a compound annual growth rate of about 22%. This is expected to fall to a compound annual growth rate of 18% for the years 1988 to 1993. Exhibit V-18 shows the industry market analysis for West Germany.

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EXHIBIT V-17

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EXHIBIT V-18

COMPUTER SOFTWARE AND SERVICES INDUSTRY MARKET ANALYSIS, 1988 WEST GERMANY

Industry Sector	Market Size (DM Millions)	Percent of Total
Manufacturing		
- Discrete	3,930	25.7
- Process	1,450	9.5
Distribution (Retail & Wholesale)	1,440	9.4
Transportation	700	4.6
Utilities	550	3.6
Banking & Finance	2,800	18.3
Insurance	1,110	7.3
Government		
- National	640	4.2
- Local	1,090	7.1
Services	1,180	7.7
Other	410	2.7
Total	15,300	100.0

2. Economic Environment

A faster pace of expansion in the West German economy has been sustained through the first half of 1988, with real GNP in the second quarter some 3.2% above year-earlier levels. Even assuming a slowdown in the second half of the year, the West German economy may expand by 2.8% in 1988, considerably above the average growth rate of the last five years.

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The economy is being driven by domestic capital investment and an improved export climate. Higher investment, both at home and abroad has produced a noticeable improvement in figures for orders and industrial production; in June the latter stands 4.7% above year-earlier levels.

A primary benefit of the economic upturn is an improvement in the public finances. Nonetheless, the public sector deficit will stand at some 2.8% of GNP in 1988 and will fall only marginally to 2.5% of GNP in 1989 despite the planned imposition of higher indirect taxes. The medium-term outlook for West Germany's public finances is even bleaker given that direct tax cuts scheduled for 1990 could push the deficit up to 3% of GNP. In proportional terms this would be among the highest in the OECD.

Undoubtedly there will be some upturn in German inflation—from 0.4% in 1987 to 1.2% in 1988 to 2% in 1989—but there is little threat of an inflationary spiral.

Prospects for 1989 are for slightly slower growth of 2.4%, accompanied by a reduced current account surplus, the latter reflecting the effects of renewed currency strength. Nonetheless, Germany will remain in substantial external surplus, a position that is expected to be maintained over the medium term.

3. Software and Services Industry Commentary

The West German market is forecast by INPUT to grow from DM15.3 billion ($8.4 billion) in 1988 to reach DM34.7 billion ($19 billion) by 1993. This five-year forecast reflects a compound annual growth rate for the period 1988 to 1993 of approximately 18%.

Exhibit V-19 shows these figures and gives the individual compound annual growth rates and market sizes, of the six distinct market sectors identified, over the period 1987 to 1993.

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EXHIBIT V-19

SOFTWARE AND SERVICES MARKET FORECAST, 1988-1993 WEST GERMANY

Subsector	Market Forecast (DM Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Processing Services	2,460	2,650	6	3,480
Network Services	175	270	30	980
Software Products	3,845	4,740	21	12,180
Professional Services	3,052	3,710	19	8,790
Systems Integration	545	690	26	2,240
Turnkey Systems	2,735	3,240	17	6,990
Total (Rounded)	12,810	15,300	18	34,660

INPUT's forecasts for the individual sectors of the West German information services Market are given in Exhibits V-20 to V-24.

The relative market share of the West German processing services market, is forecasted to decrease from 17% in 1988 to 10% in 1993, following a reduction in the growth rate from 8% in the year 1987 to 1988, to 6% per year from 1988 to 1993. This decreasing growth trend is being hastened by the continuing preference in the German market for developing solutions in-house, unless there is clear evidence that the subcontraction of system problems to outside vendors is the optimum choice.

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EXHIBIT V-20

PROCESSING SERVICES MARKET FORECAST, 1988-1993 WEST GERMANY

Subsector	Market Forecast (DM Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Transaction, Utility and Other Services	2,385	2,564	5	3,310
Facilities Management	75	87	14	170
Total	2,460	2,651	6	3,480

Network services, now separated from processing services, show an initial market surge in the average annual growth rate of 54% for the period 1987 to 1988. The compound annual growth rate is estimated to reduce to a more modest figure of 30% between 1988 and 1993.

For a more detailed analysis of the network services industry in West Germany, the interested reader is recommended to read INPUT's 1988 report entitled *Network Services - Western European Market Opportunities, 1988-1993*.

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EXHIBIT V-21

NETWORK SERVICES MARKET FORECAST, 1988-1993 WEST GERMANY

Subsector	Market Forecast (DM Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Managed Network Services	-	-	-	20
Network Applications	40	65	44	400
Electronic Information Services	135	205	22	560
Total	175	270	30	980

INPUT estimates that the software products sector will expand at a growth rate of 23% from 1987 to 1988. The five-year projection shows a reduction in the compound annual growth rate to 21% for the period 1988 to 1993. The increasing role taken by hardware manufacturers in this market is expected to continue.

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EXHIBIT V-22

SOFTWARE PRODUCTS MARKET FORECAST, 1988-1993 WEST GERMANY

Subsector	Market Forecast (DM Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Hardware Manufacturers				
Systems	2,110	2,580	20	6,430
Applications	380	470	22	1,290
Subtotal	2,490	3,050	21	7,720
Independents				
Systems	410	510	21	1,320
Applications	945	1,170	22	3,140
Subtotal	1,355	1,680	21	4,460
Total Market				
Systems	2,520	3,100	20	7,750
Applications	1,325	1,640	22	4,430
Total	3,845	4,740	21	12,180

A similar growth rate pattern of reducing percentages is predicted by INPUT in the professional services market. The growth for the period 1987 to 1988 is almost 22%, whilst that for 1988 to 1993 is estimated at 19%.

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EXHIBIT V-23

PROFESSIONAL SERVICES MARKET FORECAST, 1988-1993 WEST GERMANY

Subsector	Market Forecast (DM Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
IS Consultancy	365	450	21	1,170
Custom Software Development	2,125	2,580	19	6,110
Education and Training	550	660	17	1,480
Facilities Management	12	10	22	40
Total	3,052	3,700	19	8,800

As a reflection of the growing international interest in systems integration projects, INPUT has now shown this as a separate market sector. Accepting the statistical ambiguities of a 'population' of a relatively few but high-value projects, the estimates given show the high compound annual growth rate typical of many nascent markets.

The predicted growth rate for systems integration runs to 27% for the period 1987 to 1988 and 26% from 1988 to 1993. The overall size of this market segment is however, relatively small, representing only an estimated 4.5% of the total software and services market in 1988 and rising to a figure of 6.5% in 1993.

In line with the generally predicted trend in the market, turnkey systems are estimated by INPUT to merit on average a lower annual growth rate of just over 18% from 1987 to 1988, reducing further to 17% between 1988 and 1993.

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EXHIBIT V-24

TURNKEY SYSTEMS MARKET FORECAST, 1988-1993 WEST GERMANY

Subsector	Market Forecast (DM Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
System Hardware	1,370	1,550	12	2,690
Software and Other Charges	1,365	1,690	21	4,300
Total	2,735	3,240	17	6,990

4. Competitive Environment

Exhibits III-25 to III-30 illustrate INPUT's rankings and market shares of leading independent vendors operating in the German market. Exhibit III-25 shows the top thirty overall in the software and services market. Exhibits III-26 to III-30 give the ten leading companies in each of the main sectors.

The largest German independent information services vendor is Datev, a processing and DP consultancy company that provides services for tax consultants. (This is a substantial industry in West Germany due to the complicated tax system.) Datev is a cooperative with about 28,000 members. Its main competitor is Taylorix.

The second independent company, Fiducia, also provides industry-specific processing services, but for the banking sector. Fiducia is owned by a number of German banks. During 1987, Fiducia took over one of its competitors, Informationszentrale Rhein/Main eG.

Software AG is Europe's biggest software product company. Its best-known products are ADABAS (database system) and NATURAL (fourth-generation development environment). Software AG's most rapid growth in the last few years has been outside of Germany. Its U.S. operation, Software AG Systems Inc., had revenues of over $200 million in 1987.

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EXHIBIT V-25

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
SOFTWARE AND SERVICES
WEST GERMANY

Rank	Company	Market Share (Percent)	Estimated Revenues (DM Millions)
1	IBM	9.0	1,150
2	Nixdorf	7.0	900
3	Mannesman	4.7	600
4	Siemens	4.1	520
5	Datev	3.5	453
6	Unisys	2.4	315
7	Fiducia	1.5	190
8	SCS	1.1	145
9	Taylorix	1.1	135
10	GEI	1.0	132
11	Digital	1.0	130
12	EDV Ploenzke	0.9	120
13	SAP	0.9	112
14	Olivetti	0.9	110
14=	Computervision	0.9	110
16=	Intergraph	0.8	100
16=	Norsk Data	0.8	100
18	ADV/Orga	0.6	87
19	Softlab	0.6	85
20	Krupp Atlas	0.6	80
21	DAT Gruppe	0.5	76
22	Cap Gemini	0.5	72
23	MBP	0.5	69
24	Straessle	0.5	66
25	Software AG	0.5	63
26	IKOSS	0.4	60
27	Computer Associates	0.4	59
28=	Microsoft	0.4	54
28=	AC Automation Center	0.4	50
30	Alldata	0.4	48
	Others	51.5	6,619
	Total Market	100.0	12,810

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EXHIBIT V-26

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
PROCESSING SERVICES
WEST GERMANY

Rank	Company	Market Share (Percent)	Estimated Revenues (DM Millions)
1	Datev	14.2	350
2	Fiducia	7.7	190
3	IBM-INS	5.7	140
4	Taylorix	1.6	40
5	GEISCO	1.0	26
6	DVO	1.0	24
7	Sietec-Siemens	0.8	19
8	AC Automation Center	0.6	14
9	Alldata	0.6	14
10	Cap Gemini	0.4	10
	Others	66.4	1,633
	Total	100.0	2,460

SCS is the German subsidiary of SD-Scicon. SCS provides professional services to companies in the manufacturing, banking, insurance, utilities and government sectors. Its 1987 revenues include those of PS Systemtechnik which it acquired in 1986.

Two U.S.-owned turnkey vendors appear in the overall ranking table. These are Computervision and Intergraph. The main activities of both companies are in the CAD/CAM area. Computervision is now owned by Prime.

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EXHIBIT V-27

TOP VENDOR RANKINGS AND MARKET SHARES, 1987 SOFTWARE PRODUCTS WEST GERMANY

Rank	Company	Market Share (Percent)	Estimated Revenues (DM Millions)
1	IBM	17.7	680
2	Siemens	8.5	325
3	Nixdorf	4.7	180
4	Unisys	3.3	125
5	SAP	2.9	112
6	Software AG	1.6	60
7	Digital	1.1	55
8	Microsoft	1.4	54
9	Computer Associates	1.3	50
10	ADV/Orga	1.2	48
	Others	56.1	2,155
	Total	100.0	3,844

GEI is owned by AEG. The other AEG software subsidiary, AEG Software-Technik, is now part of GEI. (Its name is now changed to GEI Software-Technik.) About three-quarters of GEI's revenues are derived from its parent company.

EDV Studio Ploenzke is one of the few large German professional services companies that is not fully or partly owned by a major industrial group. Its revenues are derived mainly from consultancy and custom software development in a wide range of cross-industry and industry-specific areas.

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EXHIBIT V-28

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
PROFESSIONAL SERVICES
WEST GERMANY

Rank	Company	Market Share (Percent)	Estimated Revenues (DM Millions)
1	IBM	5.9	180
2 =	Unisys	3.6	110
2 =	Nixdorf	3.6	110
4	EDV-Ploenzke	3.0	90
5	Siemens	2.5	75
6	Digital	2.3	70
7	GEI	2.2	66
8	SCS	1.8	55
9	GMO	1.5	45
10	IKOSS	1.4	44
	Others	72.3	2,205
	Total	100.0	3,050

SAP is the largest European-owned applications software product company. Its total revenues have grown more than tenfold since 1980, reaching DM145 million in 1987. Growth was 60% in 1987 alone.

SAP's main German competitor is ADV/Orga, whose recent performance has not been as impressive. Revenues increased moderately in 1986 and 1987. ADV/Orga, which is a public company, suffered a DM3.5 million loss in 1987.

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EXHIBIT V-29

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
SYSTEMS INTEGRATION
WEST GERMANY

Rank	Company	Market Share (Percent)	Estimated Revenues (DM Millions)
1	IBM	16.5	90
2	Siemens	14.7	80
2	SCS	10.6	58
4	MBB	6.4	35
5	Mannesman	4.9	27
6	Cap Gemini	3.3	18
7	Andersen Consulting	3.3	18
8	Hughes	3.3	18
9	SESA	2.8	15
10	Ferranti	2.2	12
	Others	32.0	174
	Total	100.0	545

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EXHIBIT V-30

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
TURNKEY SYSTEMS
WEST GERMANY

Rank	Company	Market Share (Percent)	Estimated Revenues (DM Millions)
1	Nixdorf	21.9	600
2	Mannesman-Kienzle	18.8	515
3	Computervision	3.3	90
4	Norsk-Data	2.9	80
5	Intergraph	2.6	70
6 =	Unisys	2.4	65
6 =	Olivetti	2.1	58
8	GEI	1.8	50
9	Krupp Atlas	1.5	40
10	Taylorix	1.5	40
	Others	41.2	1,127
	Total Market	100.0	2,735

C

United Kingdom—Market Commentary

1. General Introduction

INPUT estimates that the software and services market in the U.K. was £3740 million ($6330 million) in 1987. Given a worldwide market of $120 billion for 1987, the U.K. total represents some 5.3%, whilst holding 17.7% of the Western European market of $36 billion. Software and services market estimates by country are illustrated in Exhibit III-13.

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In Exhibit V-31, INPUT predicts that the level of growth in the U.K. market will continue, but at a more conservative rate. Tracking the compound annual growth rates (Exhibit V-31) shows a figure of 33% for the period 1978 to 1981, and 30% for the period 1981 to 1984. The 1987 total of £3740 million gives a compound annual growth rate of 23% for the period 1984 to 1987. Considering these figures, and the current economic indicators, INPUT forecasts that the annual average growth rate for 1988 to 1993 will be approximately 19%. Exhibit V-32 shows the industry market analysis for the United Kingdom.

EXHIBIT V-31

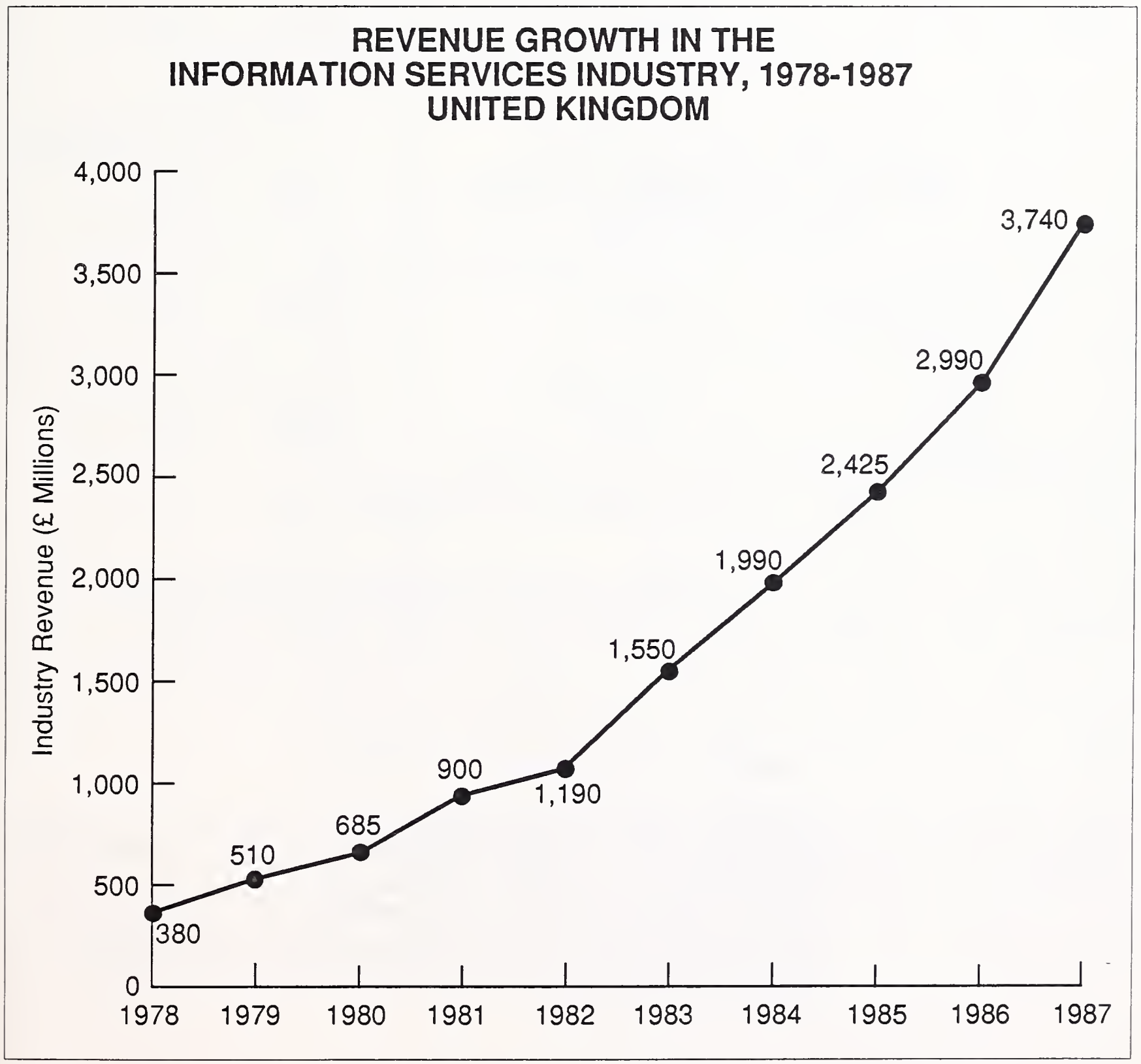

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EXHIBIT V-32

COMPUTER SOFTWARE AND SERVICES INDUSTRY MARKET ANALYSIS, 1988 UNITED KINGDOM

Industry Sector	Market Size (£ Millions)	Percent of Total
Manufacturing		
- Discrete	850	18.8
- Process	360	8.0
Distribution (Retail & Wholesale)	470	10.4
Transportation	165	3.7
Utilities	165	3.7
Banking & Finance	1,110	24.6
Insurance	375	8.3
Government		
- National	230	5.1
- Local	275	6.1
Services	375	8.3
Other	140	3.1
Total	4,515	100.0

2. Economic Environment

Despite the apparent stability of the economy, a negative undercurrent is beginning to prevail. The tax-cuts and tax relief cuts in the U.K. government's spring 1987 Budget have encouraged heavy spending and borrowing. This has led to a sharp upturn in inflation to which the Government has responded by making swinging increases in bank base rates. These have increased by an aggregate of 5.5% from 7.5% in May to 13.0% by the end of 1988.

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The impact of far heavier bank rates will inevitably bring a slowing down of corporate as well as private spending plans. This in turn may adversely affect the likely investment in the U.K. software and services market.

3. Software and Services Industry Commentary

The United Kingdom market is forecasted by INPUT to grow from £4.5 billion ($7.7 billion) in 1988 to reach £11.0 billion ($18.6 billion) by 1993. This five-year forecast reflects an average annual growth rate for the period 1988 to 1993 of approximately 19%.

Exhibit V-33 illustrates these figures and gives the individual compound annual growth rates and market sizes, of the six distinct market sectors identified, over the period 1987 to 1993.

EXHIBIT V-33

SOFTWARE AND SERVICES MARKET FORECAST, 1988-1993 UNITED KINGDOM

Subsector	Market Forecast (£ Millions)			
	1987	1988	1988-1993 CAGR (Percent)	1993
Processing Services	517	560	7	780
Network Services	165	220	28	740
Software Products	970	1,200	22	3,200
Professional Services	1,200	1,470	20	3,720
Systems Integration	205	255	24	760
Turnkey Systems	680	810	17	1,780
Total (rounded)	3,740	4,515	19	10,980

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INPUT's forecasts for the individual sectors of the U.K. software and services market are given in Exhibits V-34 to V-38.

The relative market share of the U.K. processing services market is forecasted to decrease from 12% in 1988 to 7% in 1993, following a slowdown in the annual growth rate.

EXHIBIT V-34

PROCESSING SERVICES MARKET FORECAST, 1988-1993 UNITED KINGDOM

Subsector	Market Forecast (£ Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Transaction, Utility and Other Services	450	477	4	594
Facilities Management	67	81	18	185
Total	517	558	7	780

Network services, now separated from processing services, show an initial surge in the compound annual growth rate of 33% for the period 1987 to 1988. The annual growth rate is estimated to reduce to a 28% between 1988 and 1993.

For a more detailed analysis of the network services industry in the United Kingdom, the interested reader is recommended to read INPUT's 1988 reports entitled *Network Services—Western European Market Opportunities, 1988-1993*.

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EXHIBIT V-35

NETWORK SERVICES MARKET FORECAST, 1988-1993 UNITED KINGDOM

Network Services	Market Forecast (£ Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Managed Network Services	9	12	22	33
Network Applications	56	88	33	367
Electronic Information Services	100	120	23	340
Total	165	220	28	740

INPUT estimated that the software products sector will expand at a rate of 24% from 1987 to 1988. The five-year projection shows a reduction in the compound annual growth rate to 22% for the period 1988 to 1993. The increasing role taken by hardware manufacturers in this market is expected to continue.

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EXHIBIT V-36

SOFTWARE PRODUCTS MARKET FORECAST, 1988-1993 UNITED KINGDOM

Subsector	Market Forecast (£ Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Hardware Manufacturers				
Systems	500	610	20	1,540
Applications	100	130	23	360
Subtotal	600	740	21	1,900
Independents				
Systems	120	150	22	400
Applications	250	310	24	900
Subtotal	370	460	23	1,300
Total Market				
Systems	620	760	21	1,940
Applications	350	440	23	1,260
Total	970	1,200	22	3,200

A similar growth rate pattern of reducing percentages is predicted by INPUT in the professional services market. The growth for the period 1987 to 1988 is almost 23%, whilst that for 1988 to 1993 is estimated at 20%.

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EXHIBIT V-37

PROFESSIONAL SERVICES MARKET FORECAST, 1988-1993 UNITED KINGDOM

Subsector	Market Forecast (£ Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
IS Consultancy	160	200	20	500
Custom Software Development	895	1,100	20	2,770
Education and Training	135	160	20	410
Facilities Management	10	10	24	40
Total	1,200	1,470	20	3,720

As a reflection of the growing international interest in systems integration projects, INPUT has now shown this as a separate market sector. The predicted growth rate for this sector runs to around 24% for 1987 to 1988 and this level is expected to be maintained from 1988 to 1993. The overall size of this market segment is, however, relatively small representing only an estimated 5.6% of the total software and services market in 1988, rising to a figure of around 7% in 1993.

In line with the generally predicted trend in the market, turnkey systems are predicted by INPUT to grow by around 17% per annum between 1988 and 1993.

4. Competitive Environment

The perceived polarisation of the U.K. software and services market between a few large players and many small ones continues. A number of up-and-coming organisations, such as Admiral Computing, are challenging the middle ground, joining some organisations that are slipping from their main player roles.

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EXHIBIT V-38

TURNKEY SYSTEMS
MARKET FORECAST, 1988-1993
UNITED KINGDOM

Subsector	Market Forecast (£ Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
System Hardware	335	380	12	680
Software and Other Charges	345	430	21	1,100
Total	680	810	17	1,780

The spate of takeover activity recorded last year, has to some extent abated in 1988. Nevertheless, such notable events as the formation of a major new group through the merger between Scicon and Systems Designers and the acquisition of a major U.S. company, Data Architects, by Logica showed that this market was still operating strongly.

As an alternative to the forging of permanent links, attention has now turned to the merger of joint interests under the general guise of strategic alliances. The continuing competition for faster, better results, in every aspect of the software and services market has lent impetus to the need to review the potential of both tactical and strategic alliances at all levels. In particular, the growing awareness of the importance of the systems integration market has promoted such alliances between players at the top end of the market.

The consolidation of corporate advantage through the buying-in of external skills through the acquisition of third-party organisations still continues. Software vendors and networking companies having a depth of capability in these fields remain desirable purchases, particularly to hardware manufacturers wishing to become more involved in providing system solutions to their clients.

INPUT has identified the revenues of the leading 30 vendors in the U.K. information services market in 1987, shown in Exhibit V-39. Exhibits V-40 through V-44 show the top ten vendors for the major market sectors.

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EXHIBIT V-39

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
SOFTWARE AND SERVICES
UNITED KINGDOM

Rank	Company	Market Share (Percent)	Estimated Revenues (£ Millions)
1	IBM	7.0	260
2	Unisys	2.4	90
3	Reuters	2.3	85
4	Digital	2.2	83
5 =	CAP Group	2.1	80
5 =	ICL	2.1	80
7	Nixdorf	2.0	75
8 =	Istel	1.9	70
8 =	Thorn Software	1.9	70
10	Hoskyns	1.8	68
11	Logica	1.6	58
12	Andersen Consulting	1.3	50
13 =	Centre File	1.2	45
13 =	Computervision	1.2	45
15 =	Scicon	1.0	37
15 =	Systems Designers	1.0	37
17	BIS	0.8	31
18 =	CMG	0.7	28
18 =	Data Logic	0.7	28
20 =	Computer Associates	0.7	27
20 =	Kalamazoo	0.7	27
20 =	McDonnell Douglas	0.7	27
23	Price-Waterhouse	0.7	26
24 =	GEIS	0.7	25
24 =	Oracle	0.7	25
26 =	Datastream	0.6	23
26 =	EDS	0.6	23
26 =	PA Computers & Telcom.	0.6	23
29 =	Automatic Data Processing	0.5	20
29 =	Computer People Group	0.5	20
	Others	57.8	2,154
	Total Market	100.0	3,740

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EXHIBIT V-40

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
PROCESSING SERVICES
UNITED KINGDOM

Rank	Company	Market Share (Percent)	Estimated Revenues (£ Millions)
1	Istel	5.1	35
2	IBM-INS	4.4	30
3	Datasolve (Thorn)	4.1	28
4	Hoskyns	3.5	24
5	ADP	2.9	20
6	Centre File	2.9	20
7	NMW	1.8	12
8	CMG	1.6	11
9	GEISCO	1.5	10
10	Scicon	1.5	10
	Others	70.7	480
	Total	100.0	680

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EXHIBIT V-41

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
SOFTWARE PRODUCTS
UNITED KINGDOM

Rank	Company	Market Share (Percent)	Estimated Revenues (£ Millions)
1	IBM	14.4	140
2	ICL	4.5	44
3	Digital	3.6	35
4	Unisys	3.3	32
5	Computer Associates	2.6	25
6	BIS	1.9	18
7 =	Lotus	1.8	17
7 =	Oracle	1.8	17
9	CAP Group	1.5	15
10	Thorn Software	1.4	14
	Others	63.2	613
	Total	100.0	970

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EXHIBIT V-42

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
PROFESSIONAL SERVICES
UNITED KINGDOM

Rank	Company	Market Share (Percent)	Estimated Revenues (£ Millions)
1	CAP Group	4.5	54
2	IBM	3.7	44
3	Digital	3.3	40
3	Logica	3.3	40
5	Andersen Consulting	2.5	30
6	Unisys	2.2	26
7 =	Systems Designers	1.7	20
7 =	Computer People Group	1.7	20
9 =	Thorn Computer Software	1.5	18
9 =	Scicon	1.5	18
	Others	74.2	888
	Total	100.0	1,198

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EXHIBIT V-43

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
SYSTEMS INTEGRATION
UNITED KINGDOM

Rank	Company	Market Share (Percent)	Estimated Revenues (£ Millions)
1	IBM	11.2	23
2	Logica	8.8	18
3	Andersen Consulting	7.8	16
4 =	CAP Group	6.3	13
4 =	ICL	6.3	13
6	Unisys	5.9	12
7	Software Sciences (Thorn)	4.9	10
8	Systems Designers	4.4	9
9 =	GEC	3.9	8
9 =	BT	3.9	8
	Others	36.6	75
	Total	100.0	205

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EXHIBIT V-44

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
TURNKEY SYSTEMS
UNITED KINGDOM

Rank	Company	Market Share (Percent)	Estimated Revenues (£ Millions)
1	Nixdorf	10.7	73
2	Computervision	4.4	30
3	Hoskyns	4.0	27
4	Unisys	3.2	22
5	Kalamazoo	2.9	20
6	McDonnell Douglas	2.8	19
7	Racal	2.4	16
8	Prime	2.2	15
9	Mannesman-Kienzle	2.0	14
10	Olivetti	1.9	13
	Others	63.5	431
	Total	100.0	680

D

Italy—Market Commentary

1. General Introduction

INPUT estimates that the software and services market in Italy was Lira 5355 billion ($4 billion) in 1987. This fast-growing country market thus ranks as the fourth largest in Western Europe, holding 11% of the total market. This represents some 3.3% of the worldwide market of $120 billion. Comparative software and services market estimates by country are shown in Exhibit III-13, earlier in this report.

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Exhibit V-45 illustrates INPUT's tracking of the Italian market growth curve from 1978 to 1988, showing an compound annual growth rate of about 33%. The CAGR of this formerly fast-growing market is now expected to fall to a more moderate five-year compound annual growth rate of 21% for the years 1988 to 1993. Exhibit V-46 shows the industry market analysis for Italy.

EXHIBIT V-45

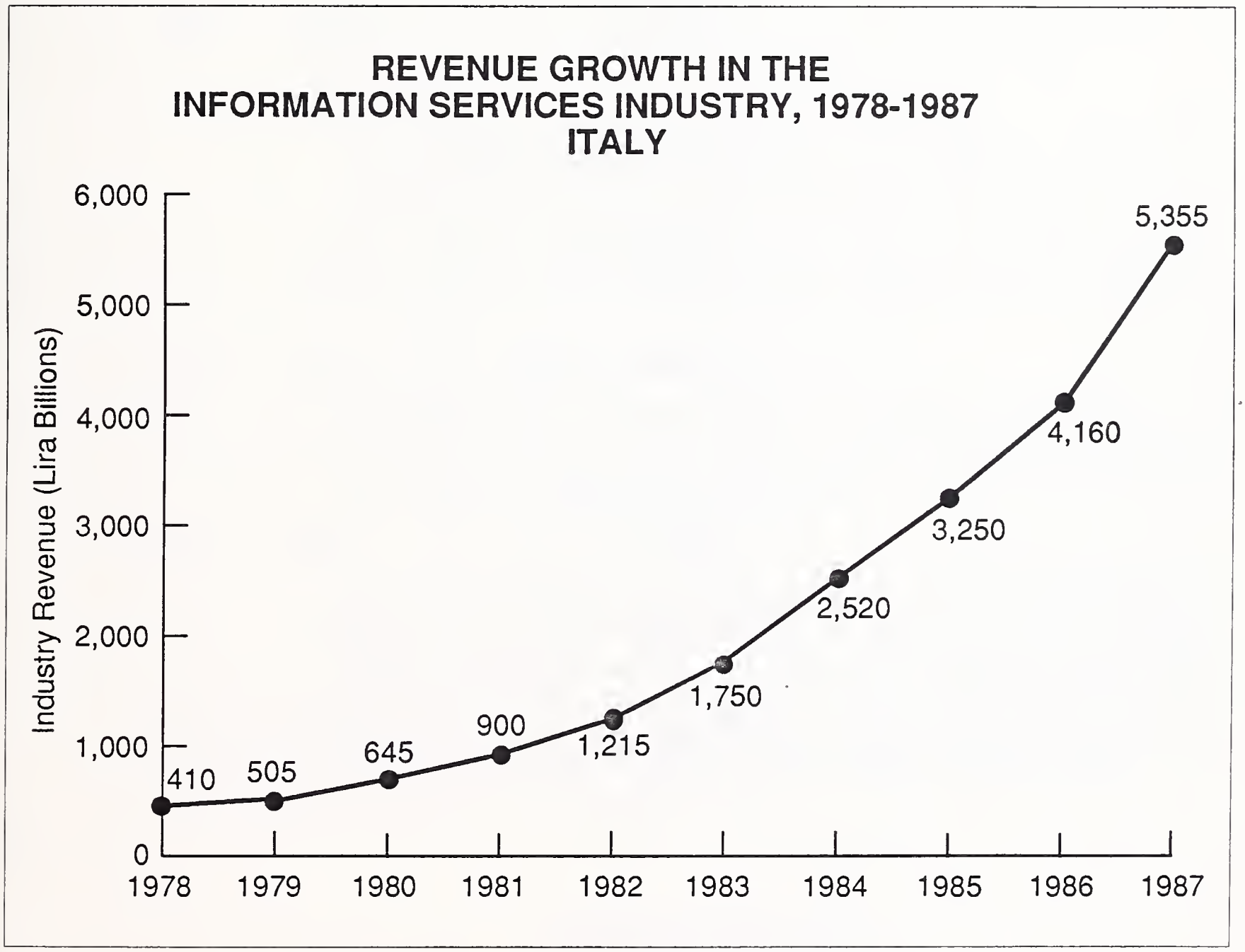

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EXHIBIT V-46

COMPUTER SOFTWARE AND SERVICES INDUSTRY MARKET ANALYSIS, 1988 ITALY

Industry Sector	Market Size (Lira Billions)	Percent of Total
Manufacturing		
- Discrete	1,280	19.7
- Process	530	8.1
Distribution (Retail & Wholesale)	480	7.3
Transportation	290	4.5
Utilities	260	4.0
Banking & Finance	1,430	21.8
Insurance	540	8.2
Government		
- National	530	8.1
- Local	490	7.5
Services	500	7.7
Other	200	3.1
Total	6,530	100.0

2. Economic Environment

The Italian economy has had one of the fastest growth rates in Western Europe over the last decade, despite structural economic and political weakness.

The government's major problem remains the ever-burgeoning public sector deficit. Decades of government overspending coupled with the borrowing required to finance the deficit have pushed the level of public debt to nearly 100% of GNP.

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The deficit for 1988 is forecast at L122 trillion ($95 billion) which represents over 12% of GNP. The new budget plans for 1988 and beyond aim to cut the deficit for 1989 to L115 trillion through a series of tax changes and revenue increases. Thereafter the aim is to reduce the deficit to L83 trillion or 6% of GNP by 1992.

A notable achievement has been to reduce the level of inflation from 15% in the mid 1980s to 5% in July 1988, only 1% above the European average. A slight rise, to about 6%, is forecast for 1989.

Despite problems of government over-spending the economy is still expected to show growth of over 2% in both 1988 and 1989.

The trade deficit continues to deteriorate. Imports grew by 9.5% in the first quarter of 1988, three times the rate of export growth. The deficit for the first four months of the year at L2.2 trillion ($2.7 bn) was over half the total for 1987. Import volume is expected to continue to outpace the growth of exports which will lead to a deterioration in the current account of around $800 million to give a deficit for 1988 of $1.5 billion.

3. Software and Services Industry Commentary

The Italian market is forecasted by INPUT to grow from Lira 6350 billion ($4.8 billion) in 1988 to reach Lira 16700 billion ($12.4) by 1993. This five year forecast reflects an compound annual growth rate for the period 1988 to 1993 of approximately 21%.

Exhibit V-47 illustrates these figures and gives the individual compound annual growth rates and market sizes of the six market sectors identified, over the period 1987 to 1993. The largest individual sector of the Italian market is software products with 30% of total revenues in 1988 growing to 34% in 1993. The highest compound annual growth rate is network services with 33% for 1988 to 1993. Also growing fast is systems integration, with an estimated CAGR of 28% between 1988 and 1993.

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EXHIBIT V-47

SOFTWARE AND SERVICES MARKET FORECAST, 1988-1993 ITALY

Subsector	Market Forecast (Lira Billions) 1987	1988	1988-1993 CAGR (Percent)	1993
Processing Services	980	1,070	7	1,520
Network Services	75	130	33	530
Software Products	1,540	1,930	23	5,410
Professional Services	1,425	1,780	23	4,980
Systems Integration	170	200	28	700
Turnkey Systems	1,165	1,420	20	3,560
Total	5,355	6,530	21	16,700

INPUT's forecasts for the individual sectors of the Italian information services market are given in Exhibits V-48 to V-52.

The relative market share of the Italian processing services market is forecasted to decrease from 16% in 1988 to 9% in 1993.

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EXHIBIT V-48

PROCESSING SERVICES MARKET FORECAST, 1988-1993 ITALY

Subsector	Market Forecast (Lira Billions) 1987	1988	1988-1993 CAGR (Percent)	1993
Transaction, Utility and Other Services	885	956	6	1,280
Facilities Management	95	112	17	245
Total	980	1,070	7	1,525

Network services, after separation from processing services, show an initial market surge in the growth rate of over 70% for the period 1987 to 1988. The five-year compound annual growth rate is estimated to decrease to a still substantial figure of 33% between 1988 and 1993. Despite these relative high growth rates this market segment is estimated to account for little over 3% of the total market, as opposed to the processing services 9% of the market share in 1993.

For a more detailed analysis of the network services industry, the interested reader is recommended to read INPUT's 1988 report entitled *Network Services—Western European Market Opportunities, 1988-1993.*

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EXHIBIT V-49

NETWORK SERVICES MARKET FORECAST, 1988-1993 ITALY

Network Services	Market Forecast (Lira Billions) 1987	1988	1988-1993 CAGR (Percent)	1993
Managed Network Services	4	10	43	60
Network Applications	26	50	42	290
Electronic Information Services	45	70	27	180
Total	75	130	33	530

INPUT estimates that the software products sector will expand at a growth rate of 25% from 1987 to 1988. The five year projection shows a reduction in the compound annual growth rate to 23% for the period 1988 to 1993. The increasing role taken by hardware manufacturers in this market is expected to continue.

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EXHIBIT V-50

SOFTWARE PRODUCTS MARKET FORECAST, 1988-1993 ITALY

Subsector	Market Forecast (Lira Billions) 1987	1988	1988-1993 CAGR (Percent)	1993
Hardware Manufacturers				
Systems	825	1,030	22	2,780
Applications	170	220	24	650
Subtotal	995	1,250	22	3,440
Independents				
Systems	160	200	22	550
Applications	385	490	24	1,430
Subtotal	545	690	23	1,980
Total Market				
Systems	985	1,230	22	3,330
Applications	555	700	24	2,080
Total	1,540	1,930	23	5,410

A similar compound annual growth rate pattern of reducing percentages is predicted by INPUT in the professional services market. The growth rate for the period 1987 to 1988 is taken as 25%, whilst that for 1988 to 1993 is estimated at 23%.

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EXHIBIT V-51

PROFESSIONAL SERVICES MARKET FORECAST, 1988-1993 ITALY

Subsector	Market Forecast (Lira Billions) 1987	1988	1988-1993 CAGR (Percent)	1993
IS Consultancy	190	240	23	680
Custom Software Development	1,105	1,380	23	3,840
Education and Training	100	130	24	370
Facilities Management	30	30	20	90
Total	1,425	1,780	23	4,980

The predicted growth rate for systems integration is expected to be in the region of 28% for the period 1988 to 1993. The overall size of this market is, however, very small representing only an estimated 3% in 1988, rising to a figure of 4% in 1993.

In line with the generally predicted trend in the market, turnkey systems are estimated by INPUT to merit on average a growth rate of 22% from 1987 to 1988, reducing further to 20% between 1988 and 1993.

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EXHIBIT V-52

TURNKEY SYSTEMS MARKET FORECAST, 1988-1993 ITALY

Subsector	Market Forecast (Lira Billions) 1987	1988	1988-1993 CAGR (Percent)	1993
System Hardware	585	690	15	1,390
Software and Other Charges	580	730	24	2,170
Total	1,165	1,420	20	3,560

4. Industry Structure

Because of the complex interrelated structure of Italian industry, there is a considerable amount of captive revenues. Consequently, distinctions between captive and noncaptive revenues of computer services firms are difficult to justify in comparison with the other major Western European country markets.

In an attempt to reflect a true picture of the Italian information services market, INPUT has compiled separate tables showing total revenues and noncaptive revenues.

Exhibit V-53 shows the leading information services vendors in Italy, together with their market shares. Exhibit V-54 shows the equivalent list including noncaptive revenues only (these are INPUT estimates, based on interviews with vendors). Three of the overall top ten companies, Enidata (ENI Group), Datamont (Montedison), and Cerved (Italian Chambers of Commerce), have significant captive revenues, and hence do not feature amongst the leading companies in Exhibit V-54.

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EXHIBIT V-53

TOP INDEPENDENT VENDOR RANKINGS AND MARKET SHARES, 1987 (TOTAL REVENUES) SOFTWARE AND SERVICES ITALY

Rank	Company	Total Revenues (Lira Billions)
1	Finsiel	550
2	G4S	210
3	Enidata	155
4	Datamont	58
5	Cap Gemini GE-DA	56
6	Cerved	55
7	Sicit	55
8	Lombardia Informatica	52
9	Data Management	50
10	IBM-INS	50
11	GEIS	47
12	Arthur Andersen	44
13	CDS Group	40
14	Sopin	39
15	ITP Group	37
16	SIME	36
17	O Group	33
18	CSI Piemonte	30
19	Sarin	30
20	System Management	30
21	Coopeld	29
22	Engineering	29
23	Pirelli Informatica	28
24	Sipe Optimation	28
25	Cedacrinord	25
26	Datitalia	23
27	Computer Associates	22
28	Software Sistemi	22
29	Database Informatica	21
30	AMDE Informatica	20

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EXHIBIT V-54

TOP VENDOR RANKINGS AND MARKET SHARES, 1987 ALL VENDORS (NON-CAPTIVE REVENUES) SOFTWARE AND SERVICES, ITALY

Rank	Company	Market Share (Percent)	Estimated Non-Captive Revenues (Lira Billions)
1	IBM	10.8	580
2	Finsiel	10.3	550
3	Olivetti/G4S	5.4	289
4	Unisys	1.8	95
5	Cap Gemini GE-DA	1.0	56
6	Sicit	1.0	55
6	Digital	1.0	55
6	Nixdorf	1.0	55
9	Lombardia Informatica	1.0	52
9	Honeywell Bull	1.0	52
11	Data Management	0.8	45
12	Andersen Consulting	0.8	44
12	GEIS	0.8	44
14	Sopin	0.7	39
15	CDS Group	0.7	37
15	ITP Group	0.7	37
17	O Group	0.6	33
18	System Management	0.6	30
19	Engineering	0.5	29
20	Enidata	0.5	25
21	Computer Associates	0.4	22
22	Database Informatica	0.4	21
23	Selesta	0.4	20
24	Datamat	0.4	19
24	Gepin	0.4	19
26	Amde Informatica	0.3	18
27	Cedacrinord	0.3	17
27	Sipe Optimation	0.3	17
27	Sysdata	0.3	17
30	CSI Piemonte	0.3	15
	Others	55.4	2,966
	Total Market	100.0	5,353

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Exhibits V-55 through V-59 show the leading vendors in the sectors of processing services, software products, professional services, systems integration and turnkey systems. These figures are for *total* revenues (captive and noncaptive).

EXHIBIT V-55

TOP VENDOR RANKINGS AND MARKET SHARES, 1987 PROCESSING AND NETWORK SERVICES ITALY

Rank	Company	Market Share (Percent)	Estimated Revenues (Lira Billions)
1	Finsiel Group	20.9	220
2	IBM-INS	3.3	35
3	Lombardia Informatica	4.0	42
4	GEIS	1.9	20
5	Data Management	1.9	20
6	CDS Group	1.3	14
7	CSI Piemonte	1.3	14
8	Sarin	1.3	14
9	Cedacrinord	1.2	13
10	Enidata	0.9	9
	Others	62.0	654
	Total	100.0	1,055

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EXHIBIT V-56

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
SOFTWARE PRODUCTS
ITALY

Rank	Company	Market Share (Percent)	Estimated Revenues (Lira Billions)
1	IBM	21.4	330
2	Olivetti/G4S	7.8	120
3	Unisys	2.6	40
4	Digital	2.1	33
5	Honeywell Bull	2.1	32
6	Computer Associates	1.4	22
7	Data Management	1.4	22
8	ITP Group	1.0	16
9	Selesta Group	0.8	12
10	CDS Group	0.6	10
	Others	58.6	905
	Total	100.0	1,540

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EXHIBIT V-57

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
PROFESSIONAL SERVICES
ITALY

Rank	Company	Market Share (Percent)	Estimated Revenues (Lira Billions)
1	Finsiel	19.6	280
2	IBM	7.0	100
3	Olivetti/G4S	5.6	80
4	Cap Gemini GE-DA	3.1	44
5	Unisys	2.3	33
6	Engineering	1.7	24
7	O Group	1.7	24
8	Sopin	1.6	23
9	System Management	1.5	21
10	Andersen Consulting	1.4	20
	Others	54.5	775
	Total Market	100.0	1,425

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EXHIBIT V-58

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
SYSTEMS INTEGRATION
ITALY

Rank	Company	Market Share (Percent)	Estimated Revenues (Lira Billions)
1	Olivetti	14.1	24
2	Andersen Consulting	12.9	22
3	IBM	11.8	20
4	Unisys	5.9	10
5	Digital	5.3	9
6	Siemens	4.7	8
7	Cap Gemini GE-DA	4.1	7
8	SESA	4.1	7
9	EDS	2.9	5
10	Ferranti	2.4	4
	Others	31.8	54
	Total Market	100.0	170

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EXHIBIT V-59

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
TURNKEY SYSTEMS
ITALY

Rank	Company	Market Share (Percent)	Estimated Revenues (Lira Billions)
1	Olivetti	5.6	65
2	Nixdorf	4.7	55
3	Sicit	3.0	35
4	Computervision	1.3	15
5	Sopin	1.2	14
6	Mannesman-Kienzle	1.0	12
7	Unisys	1.0	12
8 =	Intergraph	0.9	10
8 =	Cortis & Lentini	0.5	6
8 =	Database Informatica	0.5	6
	Others	80.3	935
	Total	100.0	1,165

5. Competitive Environment

Finsiel is Italy's leading independent computer service company, and one of the biggest in Europe. Its largest shareholder is the state-owned IRI Group. As shown in Exhibit V-60, the Finsiel Group is made up of ten firms. The complex shareholding relationships shown are typical of Italian company groups.

In a major move to broaden its activities beyond Italy—heretofore its only market—Finsiel opened a branch called Softsiel in San Diego, California, at the end of 1987. Softsiel's assignment is to promote the

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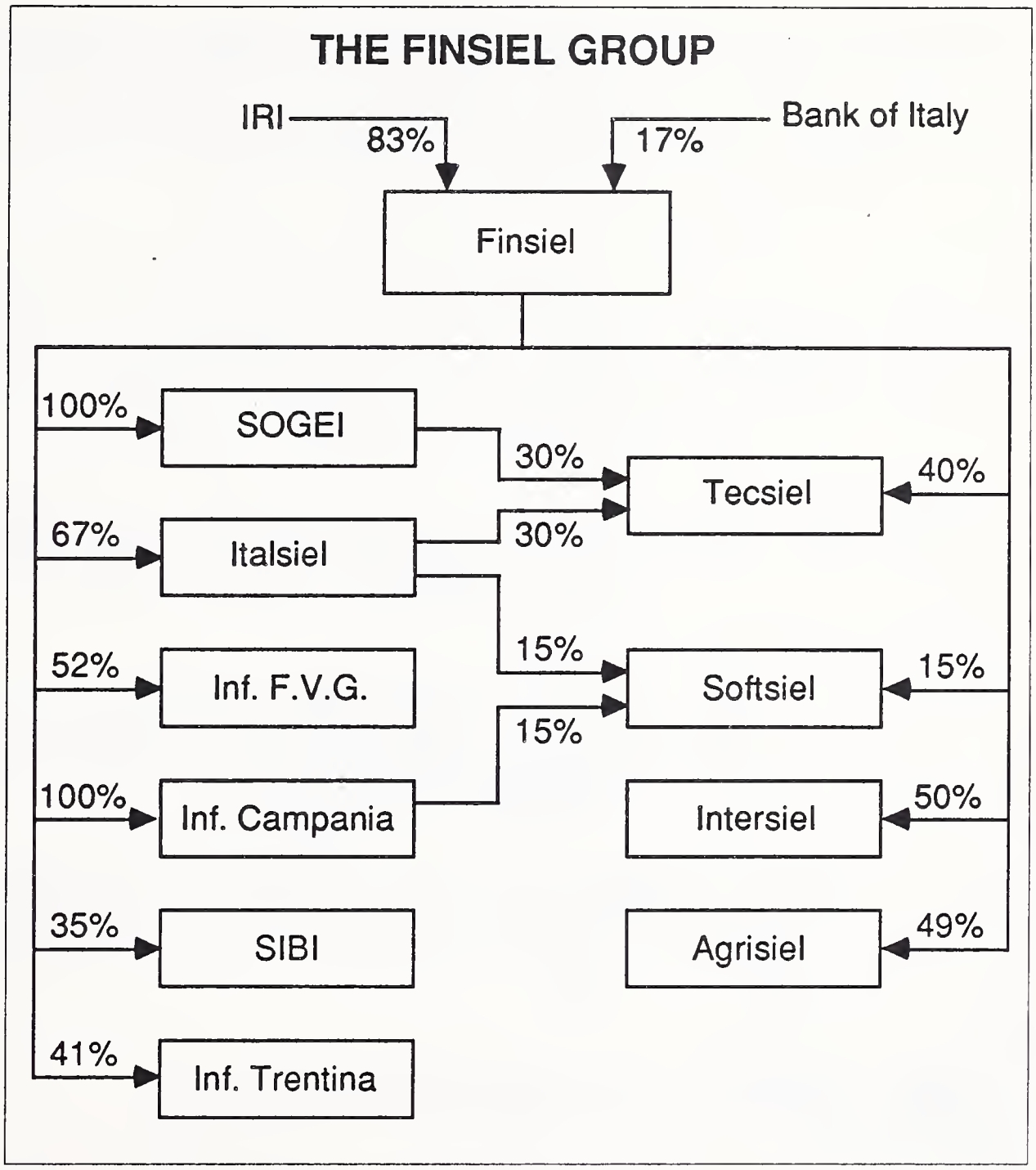
EXHIBIT V-60



group's products in North America, search out joint venture opportunities, and act as a "technology observatory" to bring new and developing technologies back to the home companies.

G4S (Generale di Sviluppo Servizi e Sistemi Software) is an Olivetti holding for companies of varying origins that have been active in the computer services field for a number of years. Some have always been Olivetti units, while others were independently formed. G4S formerly operated under the Syntax name. Because the Syntax name is well known, it continues to be the registered trademark for the G4S Group.

G4S has majority shareholdings in 12 companies and minority stakes in a further 15. Its 12 subsidiaries are Syntax, Elea, Software Sistemi, PBS, Logos Progetti, OSE, Syntax Iberica, Unit, Syntax Factory Automation, Systena, Systech and Sixcom.

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From 1989 on, Olivetti will have a separate company that will be responsible for all the software activities of the group. The head of this company will be Franco De Benedetti, the brother of the Olivetti Group chairman Carlo De Benedetti. This is part of a major restructuring of Olivetti that is being planned at the moment.

A major development in Italian industry early in 1988 was the merger of the Montedison chemical concern with the ENI oil group. The companies have combined revenues of about 35 trillion Lira. This merger is significant in the information services industry since both groups own substantial companies in this area, the most notable ones being Enidata (ENI Group) and Datamont (Montedison).

A joint company between IBM and Fiat, called INTESA, was formed in 1987. The company is involved in value-added network services, systems integration and related areas, mainly in the manufacturing and retail distribution sectors.

No revenue figures are available yet for INTESA, but the company is planning to have revenues of 200 billion Lira by the early 1990s. Many vendors interviewed by INPUT mention INTESA as one of the most important companies in Italy.

Cap Gemini Sogeti, with its GE-DA subsidiary, has established itself as a major player in the Italian market. Its 1987 revenues were up 75% to 56 billion Lira. The company is aiming for revenues of 80 billion Lira in 1988.

E

Sweden—Market Commentary

1. General Introduction

INPUT estimates that in 1987 the software and services market in Sweden was SK 7.6 billion ($ 1.2 billion). Sweden therefore represents 3.4% of the total European market or approximately 1% of the worldwide market of $120 billion. Software and services market estimates by country are shown in Exhibit III-13, earlier in this report.

2. Economic Environment

The Swedish economy remains reasonably buoyant following real growth in GDP of 2.8% in 1987. GDP grew by 1% in the first quarter of 1988, driven by an upturn in manufacturing investment and strong consumer spending.

It is likely that the economy will begin to slow through the second half of 1988 and into 1989. Although investment will remain strong throughout 1988, surveys of investment intentions suggest that the surge in capital spending will wane during the course of 1989.

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The preference for high-growth policies in the past has created problems, namely large public sector deficits (in spite of a sustained effort to trim the public finances over recent years) a tendency towards balance of payments weakness and higher-than-average inflation. Consumer prices are forecast to rise by an average of 6% in both 1988 and 1989.

3. Software and Services Industry Commentary

The turnover in the Swedish market is forecasted by INPUT to grow from SK 9.1 billion ($1.4 billion) in 1988 to reach SK 20.3 billion ($3.2 billion) by 1993. This five-year forecast reflects an average annual growth rate for the period 1988 to 1993 of approximately 18%.

Exhibit V-61 illustrates these figures and gives the individual average annual growth rates and market sizes, of the six distinct market sectors identified, over the same period.

EXHIBIT V-61

SOFTWARE AND SERVICES MARKET FORECAST, 1988-1993 SWEDEN

Subsector	Market Forecast (SK Millions)			
	1987	1988	1988-1993 CAGR (Percent)	1993
Processing Services	2,225	2,400	6	3,240
Network Services	107	200	31	790
Software Products	1,725	2,160	23	6,040
Professional Services	2,012	2,480	20	6,020
Systems Integration	155	190	27	630
Turnkey Systems	1,360	1,620	17	3,560
Total	7,585	9,050	18	20,280

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INPUT's forecasts for the individual sectors of the Sweden software and services market are given in Exhibits V-62 to V-65. The largest market section at the end of the forecast period is expected to be software products, growing from 24% of the total market in 1988 to 30% in 1993. Network services has the highest compound annual growth rate with 31% for 1988 to 1993.

EXHIBIT V-62

PROCESSING SERVICES MARKET FORECAST, 1988-1993 SWEDEN

Subsector	Market Forecast (SK Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Transaction, Utility and Other Services	2,100	2,250	5	2,940
Facilities Management	125	150	15	300
Total	2,225	2,400	6	3,240

The professional services market is predicted to be roughly the same size as the software products sector by 1993, although starting from a higher base figure in 1988.

As is the case elsewhere in Europe, processing services will experience the slowest growth—about 6% per annum. It is worth noting, however, that this sector makes up a higher proportion of the overall software and services market in the Scandinavian countries than it does in the rest of Europe.

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EXHIBIT V-63

SOFTWARE PRODUCTS MARKET FORECAST, 1988-1993 SWEDEN

Subsector	Market Forecast (SK Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Hardware Manufacturers				
Systems	890	1,110	23	3,070
Applications	190	240	24	690
Subtotal	1,080	1,350	23	3,760
Independents				
Systems	185	230	23	650
Applications	460	580	23	1,630
Subtotal	645	810	23	2,280
Total Market				
Systems	1,075	1,340	23	3,720
Applications	650	820	23	2,320
Total	1,725	2,160	23	6,040

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EXHIBIT V-64

PROFESSIONAL SERVICES MARKET FORECAST, 1988-1993 SWEDEN

Subsector	Market Forecast (SK Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
IS Consultancy	250	310	21	810
Custom Software Development	1,450	1,790	20	4,380
Education and Training	300	360	17	800
Facilities Management	10	10	18	30
Total	2,010	2,470	20	6,020

EXHIBIT V-65

TURNKEY SYSTEMS MARKET FORECAST, 1988-1993 SWEDEN

Subsector	Market Forecast (SK Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
System Hardware	680	780	12	1,380
Software and Other Charges	680	840	21	2,190
Total	1,360	1,620	17	3,570

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4. Competitive Environment

Exhibit V-66 shows the leading software and services vendors in Sweden, together with their revenues and market shares.

EXHIBIT V-66

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
SOFTWARE AND SERVICES
SWEDEN

Rank	Company	Market Share (Percent)	Estimated Revenues (SK Millions)
1	IBM	9.9	750
2	Datema	6.1	460
3	Programator	5.3	400
4	Cap Gemini Sogeti	2.7	208
5	Edebe Promotion	2.6	195
6	Unisys	2.4	180
7	Svenska Data Centr	2.3	174
8	Primdata	2.2	170
9	Bonnier Data	2.1	160
10	Data Logic	2.1	160
	Others	62.3	4,730
	Total	100.0	7,590

Also shown, as Exhibits V-67 to V-69, are the leading companies in Sweden for processing services, professional services and systems integration.

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EXHIBIT V-67

TOP VENDOR RANKINGS AND MARKET SHARES, 1987 PROCESSING AND NETWORK SERVICES SWEDEN

Rank	Company	Market Share (Percent)	Estimated Revenues (SK Millions)
1	Datema	12.9	300
2	Computer Resource	6.0	140
3	Svenska Data Centr	6.0	140
4	Data Kraft	4.7	110
5	Primdata	4.3	100
6	Conor Information	3.9	90
7	Programator	1.7	40
8	Capella	1.6	37
9	Daab Dataadministr	1.5	34
10	ADB Gruppen	1.4	33
	Others	56.0	1,306
	Total	100.0	2,330

Increasing competition can be expected in the Swedish market over the coming years. The concentration and restructuring that have recently been taking place in the industry are an indication of this.

In late 1987, Sweden's leading information services company, Datema, was bought by the Finnish company, Tietotehdas. Both of them had revenues in the region of $80 million in 1987. The new company will be easily the biggest Scandinavian information services vendor, and one of the leading ones in Europe.

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EXHIBIT V-68

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
PROFESSIONAL SERVICES
SWEDEN

Rank	Company	Market Share (Percent)	Estimated Revenues (SK Millions)
1	Programator	13.8	300
2	Datema	11.5	250
3	Data Logic	7.4	160
4	Cap Gemini	7.1	155
5	Bonnier Data	6.5	140
6	Edebe Promotion	6.5	140
7	IBM	5.5	120
8	Unisys	3.7	80
9	Primdata	3.0	65
10	Data Pulse	1.2	27
	Others	33.9	735
	Total	100.0	2,170

Datema had earlier (May 1987) merged with another Swedish computer services company, Mods Data (1986 revenues SKr 74 million). Mods Data's activities are principally focused on data processing solutions for small- and medium-sized companies on Digital equipment.

AB Programator also acquired or established a number of companies:

- Alpro Information Services is Alfa-Laval's former data processing department, in which Programator has acquired a 51% stake.

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EXHIBIT V-69

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
SYSTEMS INTEGRATION
SWEDEN

Rank	Company	Market Share (Percent)	Estimated Revenues (SK Millions)
1	Ericsson	16.1	25
2	Cap Gemini	9.7	15
3	IBM	9.7	15
4	Logica	6.5	10
5	EDS	5.2	8
	Others	52.8	82
	Total	100	155

- Basab is a software company in IBM's minicomputer segment. Programator has a 25% interest, purchased from the company's management.

- Erimatic, a development company in the UNIX area, was established together with ILAB.

- Pronova Data is SCA's former data processing department, in which a 60% stake was acquired on January 1, 1988.

Programator has many subsidiaries and partnerships in the other Scandinavian countries. The company has stated that it is planning further acquisitions in the coming year.

Another leading Swedish company, Data Logic, was bought by Cap Gemini Sogeti in March 1988. This acquisition took place with the support of the Data Logic management and will result in Cap Gemini almost doubling in size in Sweden. (The two companies were separate entities in 1987; hence their revenues are not combined in Exhibit V-66.)

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Data Logic is based in Stockholm, with branches throughout Sweden; it is also present in Norway, Denmark and the U.K. Its business consists of systems design and implementation, operations management and consulting.

F

Denmark—Market Commentary

1. General Introduction

INPUT estimates that in 1987 the software and services market in Denmark was DK 6.2 billion ($890 million). Denmark therefore represents about 2.5% of the Western European market. Software and services market estimates for all European countries are shown in Exhibit III-13, earlier in this report.

2. Economic Environment

The general election in May 1988 failed to produce a conclusive outcome and there is again a minority right-of-centre government with little room for policy manoeuvre. Economic priorities remain reducing the public sector deficit and providing a stimulus to exports.

Growth prospects remain poor. Real GDP fell by almost 1% in 1987, and is forecast to stagnate in 1988 and rise by only 0.5% in 1989. Rising unemployment and high interest rates have acted as a brake on consumer spending.

In spite of the economic downturn, inflation in Denmark remains above the European average. Consumer prices rose by 4% last year and inflation is forecast to average 5% during 1988 and 1989.

The recession has not yet produced the desired turnabout in Denmark's balance of payments; the current account deficit in 1987 was some $3 billion, and poor export competitiveness means that there will be only a slow improvement over the next two years.

Potentially the most serious aspect is Denmark's foreign debt, which amounted to more than DKr 270 billion at the end of 1987. In per capita terms this is the highest in Europe, and investor concern may make it more difficult for Denmark to cover its external financing needs.

3. Software and Services Industry Commentary

The turnover in the Denmark market is forecasted by INPUT to grow from DK 7.3 billion ($1060 million) in 1988 to reach DK 16.4 billion ($2.38 billion) by 1993. This five-year forecast reflects a compound annual growth rate for the period 1988 to 1993 of approximately 18%.

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Exhibit V-70 illustrates these figures and gives the individual compound annual growth rates and market sizes of the six distinct market sectors identified, over the same period.

EXHIBIT V-70

SOFTWARE AND SERVICES MARKET FORECAST, 1988-1993 DENMARK

Subsector	Market Forecast (DK Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Processing Services	1,860	2,000	6	2,660
Network Services	105	130	41	750
Software Products	1,440	1,800	23	5,020
Professional Services	1,510	1,870	20	4,580
Systems Integration	115	140	24	410
Turnkey Systems	1,140	1,360	17	2,990
Total (rounded)	6,170	7,300	18	16,400

INPUT's forecasts for the individual sectors of the Denmark information services market are given in Exhibits V-71 to V-74.

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EXHIBIT V-71

PROCESSING SERVICES MARKET FORECAST, 1988-1993 DENMARK

Subsector	Market Forecast (DK Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Transaction, Utility and Other Services	1,815	1,951	5	2,550
Facilities Management	45	53	16	109
Total	1,860	2,000	6	2,660

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EXHIBIT V-72

SOFTWARE PRODUCTS MARKET FORECAST, 1988-1993 DENMARK

Subsector	Market Forecast (DK Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Hardware Manufacturers				
Systems	745	930	22	2,550
Applications	160	200	24	580
Subtotal	905	1,130	23	3,130
Independents				
Systems	150	190	23	530
Applications	385	480	23	1,370
Subtotal	535	670	23	1,900
Total Market				
Systems	895	1,120	22	3,080
Applications	545	680	23	1,950
Total	1,440	1,800	23	5,030

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EXHIBIT V-73

PROFESSIONAL SERVICES MARKET FORECAST, 1988-1993 DENMARK

Subsector	Market Forecast (DK Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
IS Consultancy	210	260	21	680
Custom Software Development	1,220	1,510	20	3,690
Education and Training	70	80	16	180
Facilities Management	12	10	18	30
Total	1,510	1,860	20	4,580

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EXHIBIT V-74

TURNKEY SYSTEMS MARKET FORECAST, 1988-1993 DENMARK

Subsector	Market Forecast (DK Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
System Hardware	570	660	12	1,150
Software and Other Charges	570	710	21	1,830
Total	1,140	1,370	17	2,980

4. Competitive Environment

Exhibit V-75 shows the leading software and services vendors in Denmark, together with their revenues and market shares.

By far the largest companies are Kommunedata and Datacentralen, both of which work for the public sector. Kommunedata is owned by the Danish local authorities. Its revenues are derived exclusively from the provision of processing services for local government.

The next two companies, PBS and Landbrugets EDP Center, provide processing and professional services for the banking and agricultural sectors respectively.

Danish vendors interviewed by INPUT reported an increase in activity by foreign companies in the past year.

Among the most important of these is Cap Gemini. It is growing rapidly in Denmark, partly through acquisition. In 1987, it formed a telecommunications software company jointly with KTAS, the Danish national telephone company.

KTAS also formed a joint company with IBM. The focus area of this company is electronic data interchange.

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EXHIBIT V-75

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
SOFTWARE AND SERVICES
DENMARK

Rank	Company	Market Share (Percent)	Estimated Revenues (DK Millions)
1	Kommunedata	16.2	1,000
2	Datacentralen	9.7	600
3	PBS	7.3	450
4	IBM	7.2	440
5	Landbrugets EDP Center	4.5	280
6	JDC Data	4.1	250
7	Bording Data	3.2	200
8	SP Informatik	1.9	120
9	OK Data	1.9	117
10	Data Inform	1.7	104
	Others	42.3	2,610
	Total	100.0	6,170

A number of U.K. software and services companies are also active in Denmark. These include Logica and Software Sciences.

G

Norway—Market Commentary

1. General Introduction

INPUT estimates that in 1987 the software and services market in Norway was NK 4.8 billion ($720 million). Norway therefore represents about 2% of the Western European market. European software and services market estimates by country are shown in Exhibit III-13, earlier in this report.

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2. Economic Environment

The Norwegian economy continues to suffer from the effects of oil price weakness and an uncompetitive non-oil export sector. Growth has slackened considerably over the past two years, but the slowdown has not been sufficient to resolve Norway's balance of payments and inflation problems.

GDP growth in 1987 stood at 1.6% and is expected to fall to around 1% in both 1988 and 1989. A tighter fiscal policy, combined with higher interest rates, is causing an abrupt slowdown in private consumption, which is expected to fall in real terms in 1988 and 1989. Investment has also weakened.

At $4.2 billion, Norway's current account deficit last year amounted to 5% of GDP. The major problem is that the non-oil sector is highly uncompetitive.

In the medium term, prospects are for slower growth and higher inflation than the European average, accompanied by a sizeable external deficit. Reducing dependence on oil is the highest priority for the minority Labour government.

3. Software and Services Industry Commentary

The turnover in the Norwegian market is forecast by INPUT to grow from NK 5.6 billion ($840 million) in 1988 to reach NK 11.8 billion ($1.76 billion) by 1993. This five-year forecast reflects a compound annual growth rate for the period 1988 to 1993 of approximately 16%.

Exhibit V-76 illustrates these figures and gives the individual compound annual growth rates and market sizes, of the six distinct market sectors identified, over the same period.

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EXHIBIT V-76

SOFTWARE AND SERVICES MARKET FORECAST, 1988-1993 NORWAY

Subsector	Market Forecast (NK Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Processing Services	1,430	1,520	5	1,950
Network Services	80	110	29	400
Software Products	1,125	1,380	21	3,610
Professional Services	1,180	1,430	18	3,320
Systems Integration	85	110	20	265
Turnkey Systems	890	1,050	16	2,180
Total (rounded)	4,790	5,600	16	11,750

INPUT's forecasts for the individual sectors of the Norwegian software and services market are given in Exhibits V-77 to V-80.

Norway is expected to have slower growth than any other European country market over the next few years. This is largely due to the economic problems facing the country.

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EXHIBIT V-77

PROCESSING SERVICES MARKET FORECAST, 1988-1993 NORWAY

Subsector	Market Forecast (NK Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Transaction, Utility and Other Services	1,395	1,480	5	1,865
Facilities Management	35	40	15	85
Total	1,430	1,520	5	1,950

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EXHIBIT V-78

SOFTWARE PRODUCTS MARKET FORECAST, 1988-1993 NORWAY

Subsector	Market Forecast (NK Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Hardware Manufacturers				
Systems	580	750	21	1,840
Applications	125	150	22	410
Subtotal	705	860	21	2,250
Independents				
Systems	120	150	21	390
Applications	300	370	22	980
Subtotal	420	520	21	1,370
Total Market				
Systems	700	860	21	2,230
Applications	425	520	22	1,390
Total	1,125	1,380	21	3,620

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EXHIBIT V-79

PROFESSIONAL SERVICES MARKET FORECAST, 1988-1993 NORWAY

Subsector	Market Forecast (NK Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
IS Consultancy	160	200	20	480
Custom Software Development	950	1,150	18	2,660
Education and Training	65	80	16	160
Facilities Management	8	10	17	20
Total	1,180	1,440	18	3,320

EXHIBIT V-80

TURNKEY SYSTEMS MARKET FORECAST, 1988-1993 NORWAY

Subsector	Market Forecast (NK Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
System Hardware	445	510	11	850
Software and Other Charges	445	540	20	1,330
Total	890	1,050	16	2,180

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4. Competitive Environment

Exhibit V-81 shows the leading information services vendors in Norway, together with their revenues and market shares.

EXHIBIT V-81

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
SOFTWARE AND SERVICES
NORWAY

Rank	Company	Market Share (Percent)	Estimated Revenues (NK Millions)
1	Kommunedata	13.8	660
2	Fellesdata	11.0	527
3	IDA	10.4	500
4	IBM	8.4	400
5	Scanvest	6.0	290
6	EDB	4.5	216
7	Nordata	4.0	190
8	Vestdata	3.8	180
9	Rogalandsdata	3.3	160
10	Teamco	2.3	112
	Others	32.5	1,555
	Total	100.0	4,790

Two of the companies which feature in this exhibit, Nordata and Vestdata, merged early in 1988. (Their revenues are shown separately in the 1987 ranking.) The two companies were roughly the same size and together will form a powerful force in the Norwegian market.

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Two-thirds of the new company is owned by a number of banks, 20% by an insurance company, and the remainder by the employees or other companies.

Nordata and Vestdata were involved in very similar types of activities—the provision of computer-based information systems (products and services) for banks, financial institutions and commerce. The new company aims to provide an improved service by combining their resources, and also expects considerable cost savings to result from the merger.

Olivetti bought a 48% share of another leading Norwegian company, Scanvest, in early 1988. Scanvest is involved in a wide range of data processing and telecommunications activities. The figure shown in Exhibit V-77 is INPUT's estimate of the company's computer software and services revenues, and is approximately one-third of Scanvest's total turnover in 1987.

Norway's three leading information services companies, Kommunedata, Fellesdata and IDA, are essentially industry-specific processing services vendors.

Kommunedata is a cooperative company, owned by the seven Municipal Computer Centres of Norway (MCC's) and by the Norwegian Association of Local Authorities. The main objective of Kommunedata is to provide local councils and other public institutions with a means of meeting their needs for data processing.

Fellesdata is owned by the Norwegian Savings Bank. Most of its revenues are for captive processing services activities.

IDA is owned by a number of commercial banks. Its revenues are derived from processing and professional services for the banking sector.

According to one Norwegian vendor interviewed by INPUT, the fact that several of the large software and services companies in Norway are owned by powerful organisations (mainly banks) means that it is difficult for foreign companies to break into the market.

Another vendor indicated that Norwegian companies that expand abroad normally do so in the following order:

(1) Other Scandinavian countries
(2) West Germany
(3) United Kingdom

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H

Finland—Market Commentary

1. General Introduction

INPUT estimates that in 1987 the software and services market in Finland was FM 2.8 billion ($650 million). Finland is one of the smallest country markets, representing less than 2% of the Western European total. Software and services market estimates by country are shown in Exhibit III-13, earlier in this report.

2. Economic Environment

Finland's growth performance has been the best of the Scandinavian economies. Real GDP growth last year was 3.6% and should remain well above 2% in both 1988 and 1989. All categories of domestic expenditure are growing strongly.

The balance of payments is providing some cause for concern, with the current account swinging into deficit by $2.2 billion in 1987 compared with an average of less than $1 billion for the previous five years. Part of the explanation lies in a reduction in exports to the Soviet Union, which has not yet been compensated for by increased trade with the West.

In addition, unit labour costs have been rising faster than in many European countries, leading to a loss of trade competitiveness. The current account deficit in 1988 is forecast to $2.5 billion, and a significant improvement in 1989 is unlikely.

3. Software and Services Industry Commentary

The turnover in the Finnish market is forecast by INPUT to grow from FM 3.4 billion ($780 million) in 1988 to reach FM 7.7 billion ($1.77 billion) by 1993. This five-year forecast reflects a compound annual growth rate for the period 1988 to 1993 of approximately 18%.

Exhibit V-82 illustrates these figures and gives the individual compound annual growth rates and market sizes, of the six distinct market sectors identified, over the same period.

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EXHIBIT V-82

SOFTWARE AND SERVICES MARKET FORECAST, 1988-1993 FINLAND

Subsector	Market Forecast (FM Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Processing Services	860	940	7	1,330
Network Services	56	70	29	260
Software Products	660	830	23	2,310
Professional Services	706	870	20	2,190
Systems Integration	30	40	34	175
Turnkey Systems	530	640	17	1,430
Total (rounded)	2,840	3,390	18	7,700

INPUT's forecasts for the individual sectors of the Finnish software and services market are given in Exhibits V-83 to V-86.

The growth rate predicted for Finland for the forecast period is the highest among the Scandinavian countries. Although the Finnish market is the smallest in Scandinavia at present, and is much less mature than Sweden, INPUT forecasts reasonably strong growth until 1993, by which time it is estimated that the Finnish and Norwegian markets will be about the same size.

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EXHIBIT V-83

PROCESSING SERVICES MARKET FORECAST, 1988-1993 FINLAND

Subsector	Market Forecast (FM Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Transaction, Utility and Other Services	800	868	6	1,189
Facilities Management	60	70	16	146
Total	860	938	7	1,335

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EXHIBIT V-84

SOFTWARE PRODUCTS MARKET FORECAST, 1988-1993 FINLAND

Subsector	Market Forecast (FM Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Hardware Manufacturers				
Systems	340	430	22	1,170
Applications	75	90	25	270
Subtotal	415	520	23	1,440
Independents				
Systems	70	90	23	250
Applications	175	220	23	620
Subtotal	245	310	23	870
Total Market				
Systems	410	510	23	1,420
Applications	250	320	23	890
Total	660	830	23	2,310

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EXHIBIT V-85

PROFESSIONAL SERVICES MARKET FORECAST, 1988-1993 FINLAND

Subsector	Market Forecast (FM Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
IS Consultancy	95	120	22	320
Custom Software Development	560	690	20	1,730
Education and Training	45	50	17	120
Facilities Management	6	10	19	20
Total	706	870	20	2,190

EXHIBIT V-86

TURNKEY SYSTEMS MARKET FORECAST, 1988-1993 FINLAND

Subsector	Market Forecast (FM Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
System Hardware	265	310	12	550
Software and Other Charges	265	330	21	880
Total	530	640	17	1,430

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4. Competitive Environment

Exhibit V-87 shows the leading software and services vendors in Finland, together with their revenues and market shares.

EXHIBIT V-87

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
SOFTWARE AND SERVICES
FINLAND

Rank	Company	Market Share (Percent)	Estimated Revenues (FM Millions)
1	Tietotehdas	12.4	353
2	Valtion-VTKK	11.6	330
3	IBM	7.0	200
4	PG-Yhtiot/Tietovoima	5.7	162
5	Elorg-Data	4.0	115
6	Valmet Data System	3.7	106
7	Paakaupunkiseudun	3.7	105
8	Kunnallistieto	3.3	94
9	Unic-Yhtiot	2.5	70
10	Digital	2.1	60
	Others	44.0	1,245
	Total	100.0	2,840

Possibly the main competitive development in the Scandinavian software and services market in the last few years was the acquisition of the Swedish company Datema by Tietotehdas (as discussed in the section on Sweden above).

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Tietotehdas is a public company whose main activities are in the professional services area. It also has revenues in processing services, software products and hardware. Tietotehdas has links with several U.S. software companies, including Cullinet and WordPerfect.

The second largest Finnish software and services company is Valtion Tietokonekeskus (VTKK), the Finnish State Computer Centre. It receives about three-quarters of its income from customers in central government, around 10% from other state agencies or institutes and the rest from non-government customers.

Only a few Finnish companies can offer the comprehensive selection of services provided by a company like Tietotehdas. Most companies are small and have a high degree of specialisation in their particular field.

There are close ties between Finland and Sweden in the software and services sector because of similar legislation, language and culture. In addition to the Tietotehdas-Datema connection, the Swedish company, Programator, has several subsidiaries in Finland. The biggest one is Programatic.

The Swedish market is more mature than the Finnish one. Vendors interviewed by INPUT in Finland estimated that their market lags technologically about three or four years behind Sweden. The Swedish market was also said to be much bigger and more competitive due to the greater selection of vendors and higher disposable income of companies than in Finland. The Finnish market is, however, expected to show a higher growth rate in the next few years.

There are close ties between Finland and the USSR. However, exports of high-tech products to the Soviet Union are restricted. A number of vendors maintained that there is significant potential in the Soviet market. (One company, Elorg Data already has significant activities in the USSR.) However it was suggested by another vendor that the Soviets are interested in buying Western hardware and software not for commercial purposes, but only for experimental reasons.

One Finnish vendor commented that the main reason why there is relatively little activity by Finnish vendors abroad is because the limited size of the home market does not allow for the competitive development of products for export. (This would apply particularly to software products.)

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I

Netherlands—Market Commentary

1. General Introduction

INPUT estimates that in 1987 the software and services market in Netherlands was Dfl 3.9 billion ($ 1.9 billion). Netherlands therefore holds about 5% of the total European market or some 1.6% of the worldwide market of $120 billion. Software and services market estimates by country are shown in Exhibit III-13, earlier in this report.

2. Economic Environment

Although the Netherlands has benefited a little from stronger expansion in Germany, the domestic economy remains weak. Growth this year is unlikely to exceed 1.5%, following 1987's higher-than-expected 2.5%. The government is faced with a major policy dilemma, namely how to pursue a medium-term reduction in the public sector deficit without jeopardising short-term growth.

The domestic economy is not expected to provide a major stimulus to growth and, with export growth subsiding between now and end-1989, the Netherlands appears set for expansion of less than 2% in 1989.

The 1988 inflation rate will be in the region of 0.8%, the lowest in the EEC. It is expected to increase to about 2% in 1989.

3. Software and Services Industry Commentary

The Dutch market is forecast by INPUT to grow from Dfl 4.7 billion ($2290 million) in 1988 to reach Dfl 10.4 billion ($5.1 billion) by 1993. This five-year forecast reflects a compound annual growth rate for the period 1988 to 1993 of approximately 17%.

Exhibit V-88 illustrates these figures and gives the individual compound annual growth rates and market sizes, of the six distinct market sectors identified, over the same period.

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EXHIBIT V-88

SOFTWARE AND SERVICES MARKET FORECAST, 1988-1993 NETHERLANDS

Subsector	Market Forecast (Dfl Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Processing Services	760	810	4	980
Network Services	110	160	22	410
Software Products	955	1,180	22	3,180
Professional Services	1,230	1,500	19	3,530
Systems Integration	95	130	24	380
Turnkey Systems	775	920	16	1,920
Total	3,930	4,700	17	10,400

INPUT's more detailed forecasts for the individual sectors of the Dutch software and services market are given in Exhibits V-89 to V-92.

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EXHIBIT V-89

PROCESSING SERVICES MARKET FORECAST, 1988-1993 NETHERLANDS

Subsector	Market Forecast (Dfl Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Transaction, Utility and Other Services	710	750	3	860
Facilities Management	50	60	15	120
Total	760	810	4	980

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EXHIBIT V-90

SOFTWARE PRODUCTS MARKET FORECAST, 1988-1993 NETHERLANDS

Subsector	Market Forecast (Dfl Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Hardware Manufacturers				
Systems	505	620	22	1,650
Applications	100	130	22	350
Subtotal	605	750	22	2,000
Independents				
Systems	100	120	23	340
Applications	250	310	22	840
Subtotal	350	430	22	1,180
Total Market				
Systems	605	750	22	1,990
Applications	350	440	22	1,190
Total	955	1,190	22	3,180

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EXHIBIT V-91

PROFESSIONAL SERVICES MARKET FORECAST, 1988-1993 NETHERLANDS

Subsector	Market Forecast (Dfl Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
IS Consultancy	155	190	21	490
Custom Software Development	915	1,120	18	2,610
Education and Training	150	180	17	400
Facilities Management	10	10	18	30
Total	1,230	1,500	19	3,530

EXHIBIT V-92

TURNKEY SYSTEMS MARKET FORECAST, 1988-1993 NETHERLANDS

Subsector	Market Forecast (Dfl Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
System Hardware	390	450	11	770
Software and Other Charges	385	470	19	1,150
Total	775	920	16	1,920

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4. Competitive Environment

Exhibit V-93 shows the leading software and services vendors in the Netherlands, together with their revenues and market shares.

EXHIBIT V-93

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
SOFTWARE AND SERVICES
NETHERLANDS

Rank	Company	Market Share (Percent)	Estimated Revenues (Dfl Millions)
1	Volmac	9.4	370
2	IBM	7.1	280
3	Cap Gemini/Pandata	5.0	196
4	Raet	4.3	170
5	CMG	2.7	106
6	BSO	2.6	100
7	Unisys	2.6	100
8	CB Automatisierung	2.2	85
9	Computer Centrum Nederland	1.8	72
10	Digital	1.8	70
	Others	60.5	2,371
	Total	100.0	3,920

Volmac is by far the biggest computer services company in the Netherlands, and one of the largest in Europe. The company's activities are mainly in the Netherlands, but it also has business in other European countries (mainly Belgium). During the first half of 1988, Volmac was involved in some interesting developments in the stock market.

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In May 1988, Volmac put 15% of its equity for quotation on the Amsterdam stock exchange. The 3.9 million shares were priced at $36.70, valuing the company at the equivalent of $954 million. Volmac's holding company retained 35.3% of the shares, institutional investors held 35.5%, and Volmac's employees 14.2%.

Shortly afterwards (in mid-June), Cap Gemini Sogeti took a 5% stake in Volmac. (Volmac had been a significant shareholder in the CAP Group before its merger with Sema Metra; its share dropped following the merger.)

Cap Gemini Sogeti now has a very strong position in the Dutch market. It already had a strong subsidiary in the Netherlands before taking over Pandata in 1986. Their combined revenues now put Cap Gemini in third place in the ranking list. It is obvious that, if Cap Gemini were to take over Volmac (which is quite possible), it would be in a very dominant position in the Netherlands.

The second biggest Dutch-owned computer services company is Raet. It is also planning a stock market placing shortly. Nearly 90% of Raet's revenues come from the Netherlands; most of the rest is derived from its Belgian subsidiary. Raet's management have big plans for growth in the next ten years; by the year 2000, they aim to have an annual turnover of Dfl 1 billion.

U.K.-owned computer service companies have always been quite active in the Netherlands. For many of them, the Dutch market was the first step in the export market. Those with an important presence in the Dutch market include CMG, Logica and CPP (CAP Group).

CMG (Computer Management Group) is an employee-owned company. In 1987, the company's turnover (roughly £60 M) was split: Netherlands 51%, U.K. 47%, West Germany 2%.

J

Belgium—Market Commentary

1. General Introduction

INPUT estimates that the software and services market in Belgium was BF 40.5 billion ($1.06 billion) in 1987. Belgium therefore holds about 3% of the total European market. This represents some 0.9% of the worldwide market of $120 billion. Software and services market estimates by country are shown in Exhibit III-13, earlier in this report.

2. Economic Environment

The Belgian economy remains beset by the problem of controlling the soaring public sector deficit. Efforts to cut public spending have dampened domestic activity and employment. The five-party coalition is

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committed to austerity measures required to come to grips with the problems of runaway government spending. Public debt now stands at 134% of GNP.

In 1988, weaker domestic demand will cut import growth, while a reasonably good outlook for Belgium's trading partners should support export volume. However net trade will still exert a negative influence on growth. The current account surplus is forecast to diminish to $2.5 billion in 1988. GNP overall is forecast to grow by 1.7% in 1988, slowing to 1.2% the year after, below the European average.

A high level of unemployment will continue to ensure moderate wage increases and consumer prices should remain firmly under control, rising by 1.2% in 1988 and accelerating to 2.5% in 1989.

3. Software and Services Industry Commentary

The Belgium market is forecast by INPUT to grow from BF 48.7 billion ($1280 million) in 1988 to reach BF 111 billion ($2910 Million) by 1993. This five-year forecast reflects a compound annual growth rate for the period 1988 to 1993 of approximately 18%.

Exhibit V-94 illustrates these figures and gives the individual compound annual growth rates and market sizes, of the six distinct market sectors identified, over the same period.

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EXHIBIT V-94

SOFTWARE AND SERVICES MARKET FORECAST, 1988-1993 BELGIUM

Subsector	Market Forecast (BF Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Processing Services	7,360	7,800	4	9,490
Network Services	1,335	1,720	23	4,760
Software Products	9,950	12,390	22	33,990
Professional Services	12,290	15,090	19	36,360
Systems Integration	1,485	2,020	24	5,900
Turnkey Systems	8,070	9,620	16	20,530
Total	40,490	48,640	18	111,030

INPUT's more detailed forecasts for the individual sectors of the Belgian software and services market are given in Exhibit V-95 to V-98.

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EXHIBIT V-95

PROCESSING SERVICES MARKET FORECAST, 1988-1993 BELGIUM

Subsector	Market Forecast (BF Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Transaction, Utility and Other Services	6,880	7,240	3	8,365
Facilities Management	480	560	15	1,125
Total	7,360	7,800	4	9,490

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EXHIBIT V-96

SOFTWARE PRODUCTS MARKET FORECAST, 1988-1993 BELGIUM

Subsector	Market Forecast (BF Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Hardware Manufacturers				
Systems	5,280	6,550	22	17,690
Applications	1,030	1,290	24	3,710
Subtotal	6,310	7,840	22	21,400
Independents				
Systems	1,030	1,290	22	3,550
Applications	2,610	3,260	23	9,030
Subtotal	3,640	4,550	23	12,580
Total Market				
Systems	6,310	7,830	22	21,240
Applications	3,640	4,560	23	12,740
Total	9,950	12,390	22	33,980

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EXHIBIT V-97

PROFESSIONAL SERVICES MARKET FORECAST, 1988-1993 BELGIUM

Subsector	Market Forecast (BF Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
IS Consultancy	1,620	2,000	21	5,270
Custom Software Development	9,550	11,750	19	28,020
Education and Training	1,000	1,200	18	2,730
Facilities Management	120	150	18	340
Total	12,290	15,100	19	36,360

EXHIBIT V-98

TURNKEY SYSTEMS MARKET FORECAST, 1988-1993 BELGIUM

Subsector	Market Forecast (BF Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
System Hardware	4,070	4,680	12	8,250
Software and Other Charges	4,000	4,940	20	12,290
Total	8,070	9,620	16	20,540

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4. Competitive Environment

Exhibit V-99 shows the leading information services vendors in Belgium, together with their revenues and market shares.

EXHIBIT V-99

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
SOFTWARE AND SERVICES
BELGIUM

Rank	Company	Market Share (Percent)	Estimated Revenues (BF Millions)
1	IBM	6.9	2,800
2	CIG	5.9	2,400
3	Intersys	2.5	1,000
4	Cap Gemini/SESA	2.3	940
5	ORDA-B	2.2	900
6	Sobemap	2.0	800
7	Unisys	1.9	750
8	Trasys	1.8	730
9	Steriabel	1.5	595
10	Administra	1.4	570
	Others	71.6	29,040
	Total	100.0	40,530

The most significant development in the Belgian software and services market recently was the merger between CIG and Intersys early in 1988. These two companies, which occupy the first and second positions respectively in INPUT's 1987 ranking, together form a group much larger than any other Belgian company. The new company is called Group CIG Intersys.

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CIG's main activities are in the network services area, but the company also provides professional services, software products and turnkey systems. The company has extensive activities in the CAD/CAM area. The activities of Intersys also cover a broad range, only about 50% of which can be classified as information services.

CIG made a small profit (about $2 million) in 1987, while Intersys suffered quite a significant loss (around $7 million).

The next biggest Belgian company, ORDA-B, is also involved in a wide range of professional services, networking and software product activities. Most of its revenues are in Belgium; it also has interests in the Netherlands and Luxembourg.

For geographic and language reasons, there is a strong influence of French information services companies in the Belgian market.

The most significant French-owned company is Sobemap, which is the main Belgian subsidiary of Sema Metra (now part of the Sema Group). Sobemap's main activities are professional services; it also produces a range of commercial software packages.

Cap Gemini Sogeti also has a strong Belgian subsidiary, as does Steria (its subsidiary is called Steriabel).

There are also a number of U.S.-owned companies that have significant revenues in Belgium. These include IBM-INS and GEISCO in the processing and network services area, and the software product vendor, Cullinet.

K

Switzerland—Market Commentary

1. General Introduction

INPUT estimates that in 1987 the software and services market in Switzerland was SF 1.83 billion ($1.21 billion). Switzerland therefore represents about 3.5% of the total market in Western Europe or some 1% of the worldwide market of $120 billion. Software and services market estimates by country are shown in Exhibit III-13, earlier in this report.

2. Economic Environment

Growth in the Swiss economy continues to be underpinned by strong domestic demand. Growth in investment has also been very high when compared with Switzerland's European rivals, running at over 12% per annum.

Recent favourable world economic prospects have improved the outlook for Swiss exports. Notwithstanding this positive outlook, net trade will

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continue to be a drag on growth as import growth outstrips exports, buoyed by high consumer durable demand. The traditional surplus on invisibles will ensure a healthy current account surplus of around $6 billion in 1988 and $5 billion in 1989.

Swiss inflation remains low at around 2%. A modest upturn, to about 2.3%, is expected in 1989.

3. Software and Services Industry Commentary

The Swiss market in forecasted by INPUT to grow from SF 2.2 billion ($1450 million) in 1988 to reach SF 4.9 billion ($3.3 billion) by 1993. This five-year forecast reflects a compound annual growth rate for the period 1988 to 1993 of approximately 18%.

Exhibit V-100 illustrates these figures and gives the individual compound annual growth rates and market sizes, of the six distinct market sectors identified, over the same period.

EXHIBIT V-100

SOFTWARE AND SERVICES MARKET FORECAST, 1988-1993 SWITZERLAND

Subsector	Market Forecast (SF Millions)			
	1987	1988	1988-1993 CAGR (Percent)	1993
Processing Services	310	330	6	440
Network Services	86	110	15	210
Software Products	575	710	21	1,830
Professional Services	462	560	19	1,360
Systems Integration	38	50	28	175
Turnkey Systems	360	430	17	930
Total (rounded)	1,830	2,190	18	4,940

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INPUT's more detailed forecasts for the individual sectors of the Swiss software and services market are given in Exhibit V-101 to V-104.

EXHIBIT V-101

PROCESSING SERVICES MARKET FORECAST, 1988-1993 SWITZERLAND

Subsector	Market Forecast (SF Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Transaction, Utility and Other Services	295	312	5	400
Facilities Management	15	18	17	40
Total	310	330	6	440

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EXHIBIT V-102

SOFTWARE PRODUCTS MARKET FORECAST, 1988-1993 SWITZERLAND

Subsector	Market Forecast (SF Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Hardware Manufacturers				
Systems	315	390	20	960
Applications	60	80	20	200
Subtotal	375	470	20	1,170
Independents				
Systems	60	70	22	190
Applications	140	170	23	470
Subtotal	200	240	22	660
Total Market				
Systems	375	460	20	1,150
Applications	200	250	22	670
Total	575	710	21	1,820

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EXHIBIT V-103

PROFESSIONAL SERVICES MARKET FORECAST, 1988-1993 SWITZERLAND

Subsector	Market Forecast (SF Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
IS Consultancy	55	70	21	180
Custom Software Development	320	390	19	940
Education and Training	85	100	19	240
Facilities Management	2	2	20	6
Total	462	562	19	1,360

EXHIBIT V-104

TURNKEY SYSTEMS MARKET FORECAST, 1988-1993 SWITZERLAND

Subsector	Market Forecast (SF Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
System Hardware	180	210	12	360
Software and Other Charges	180	220	21	570
Total	360	430	17	930

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4. Competitive Environment

Exhibit V-105 shows the leading software and services vendors in Switzerland, together with their revenues and market shares.

EXHIBIT V-105

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
SOFTWARE AND SERVICES
SWITZERLAND

Rank	Company	Market Share (Percent)	Estimated Revenues (SF Millions)
1	Telekurs	10.9	200
2	IBM	5.5	100
3	Fides	2.7	50
4	Digital	2.6	48
5	Cap Gemini	1.7	32
6	Unisys	1.4	25
7	ACI	1.1	20
8	EBB	1.1	20
9	Systor	1.1	20
10	ISAG	1.0	19
	Others	70.9	1,296
	Total	100.0	1,830

Telekurs had total 1987 revenues of SF 240 million. This is split fairly evenly between processing services and professional services. The company's revenues are mainly derived from Swiss banks. These banks are also major shareholders in Telekurs. (Hence it could be argued that Telekurs' revenues are captive and should not be included, but INPUT has chosen to include Telekurs for comparative purposes.)

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The other Swiss companies have much smaller software and services revenues. Fides had total revenues of SF 180 million in 1987, of which a little over one-quarter is estimated to have come from software and services (mainly professional services).

Cap Gemini Sogeti has a significant presence in Switzerland. Its Swiss subsidiary was set up about 20 years ago, making it one of the company's longest established operations outside of France.

One of the most important companies in the Swiss information services industry is the finance organisation, Schweizer Bankverein. It has one major software subsidiary, Systor AG, and two smaller ones, Schweizerische Treuhand Informatics and Simultan. Systor is mainly a professional services vendor, but also has a range of software products, including the "Sapiens" CASE tool that it markets internationally.

One of the companies that features in the Swiss Top 10 is ISAG (Industrie Software AG). This company was formed when five small software companies merged in 1987. The individual companies are located in the different linguistic regions of Switzerland. They came together in order to combine their development resources so that together they could satisfy a broader range of demands from clients in all parts of the country.

L Austria—Market Commentary

1. General Introduction

INPUT estimates that in 1987 the software and services market in Austria was Sch 7.45 billion ($580 million). Austria is therefore one of the smallest territories in Western Europe, accounting for only 1.6% of the total market. This represents some 0.5% of the worldwide market of $120 billion. Software and services market estimates by country are shown in Exhibit III-13, earlier in this report.

2. Economic Environment

Economic developments in Austria over the past 18 months have been strongly influenced by the period of fiscal austerity imposed by the present coalition government to reduce the government deficit.

After years of pursuing an interventionist policy to keep unemployment down and the economy growing above the European average, attention has now been switched to reform of the tax system and the threat of a growing public sector deficit to Austria's hard-currency policy.

The 1988 budget sought to reduce the federal deficit, excluding interest payments, to 2.5% by 1992. The announced reductions in public spending and a slowdown in the rate of growth of consumer spending will mean a period of slower growth for the Austrian economy. Whilst

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business surveys point to a continued moderate expansion in the volume of business investment, the pace of investment growth will slow significantly.

A brighter outlook for Western Europe as a whole should see export growth pick up, whilst the slowdown in consumer spending reduces the pace of expansion in imports. Net trade is therefore likely to be less of a drag on overall GNP growth than in previous years. GNP growth is expected to be 1.5% in both 1988 and 1989.

Given the less than favourable trends in the economy, inflation in unlikely to be a major problem, with price rises expected to be around 2% in 1988 rising to 3% in 1989.

3. Software and Services Industry Commentary

The Austrian market is forecasted by INPUT to grow from Sch 8.9 billion ($690 million) in 1988 to reach Sch 20.2 billion ($1.6 billion) by 1993. This five-year forecast reflects a compound annual growth rate for the period 1988 to 1993 of approximately 18%.

Exhibit V-106 illustrates these figures and gives the individual compound annual growth rates and market sizes, of the six distinct market sectors identified, over the same period.

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EXHIBIT V-106

SOFTWARE AND SERVICES MARKET FORECAST, 1988-1993 AUSTRIA

Subsector	Market Forecast (Sch Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Processing Services	1,520	1,640	6	2,180
Network Services	90	170	36	780
Software Products	2,370	2,920	21	7,490
Professional Services	1,815	2,200	19	5,310
Systems Integration	140	190	27	640
Turnkey Systems	1,490	1,770	17	3,810
Total	7,425	8,890	18	20,210

INPUT's more detailed forecasts for the individual sectors of the Austrian software and services market are given in Exhibit V-107 to V-110.

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EXHIBIT V-107

PROCESSING SERVICES MARKET FORECAST, 1988-1993 AUSTRIA

Subsector	Market Forecast (Sch Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Transaction, Utility and Other Services	1,470	1,580	5	2,055
Facilities Management	50	60	16	125
Total	1,520	1,640	6	2,180

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EXHIBIT V-108

SOFTWARE PRODUCTS MARKET FORECAST, 1988-1993 AUSTRIA

Subsector	Market Forecast (Sch Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Hardware Manufacturers				
Systems	1,300	1,590	20	3,960
Applications	235	290	23	800
Subtotal	1,535	1,880	20	4,760
Independents				
Systems	255	310	21	800
Applications	580	720	22	1,930
Subtotal	835	1,030	22	2,730
Total Market				
Systems	1,555	1,910	20	4,760
Applications	815	1,010	22	2,730
Total	2,370	2,920	21	7,490

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EXHIBIT V-109

PROFESSIONAL SERVICES MARKET FORECAST, 1988-1993 AUSTRIA

Subsector	Market Forecast (Sch Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
IS Consultancy	225	280	21	720
Custom Software Development	1,325	1,610	19	3,810
Education and Training	255	310	20	750
Facilities Management	10	10	20	30
Total	1,815	2,210	19	5,310

EXHIBIT V-110

TURNKEY SYSTEMS MARKET FORECAST, 1988-1993 AUSTRIA

Subsector	Market Forecast (Sch Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
System Hardware	745	850	12	1,460
Software and Other Charges	745	920	21	2,350
Total	1,490	1,770	17	3,810

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4. Competitive Environment

Exhibit V-111 shows the leading software and services vendors in Austria, together with revenues and market shares.

EXHIBIT V-111

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
SOFTWARE AND SERVICES
AUSTRIA

Rank	Company	Market Share (Percent)	Estimated Revenues (Sch Millions)
1	IBM	10.1	750
2	Dataservice	2.7	200
3	Siemens	2.0	150
4	Management Data	1.7	125
5	Unisys	1.7	120
6	Digital	1.3	75
6	GRZ LINZ	1.3	100
7	VRZ	1.3	100
9	Voest-Alpine	1.1	80
10	BEKO	0.9	70
	Others	75.9	5,630
	Total	100.0	7,425

The hardware manufacturers have traditionally been strong in the Austrian software market. Particularly strong are Digital Equipment, IBM, Siemens and Unisys.

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Siemens has a major software development centre in Austria, producing about Sch 1.5 billion ($117 million) worth of software annually, mainly for export.

There are very few large independent software and service companies. As shown in Exhibit V-111, only a handful have revenues of over Sch 100 million (about $8 million).

The leading independent company, Dataservice, earns about half of its revenues from software and services. It also has significant revenues from hardware. The figure shown in Exhibit V-111 includes a wide range of activities—professional services, software products, processing and network services, and turnkey systems.

The second independent company in the ranking, Management Data, is owned by the Creditanstalt-Bankverein, Austria's top financial institute. It is active in various sectors of the software and services industry (mainly professional services and software products), not only in the financial sector, but also in industry and commerce.

M

Spain—Market Commentary

1. General Introduction

INPUT estimates that in 1987 the software and services market in Spain was Pta 112 billion ($925 million). Spain is therefore one of the smaller but fastest growing markets in Western Europe, accounting for 2.6% of the total market. This represents some 0.8% of the worldwide market of $120 billion. Software and services market estimates by country are shown in Exhibit III-13, earlier in this report.

2. Economic Environment

The Spanish economy has been growing rapidly in recent years. In 1987 GDP rose by 5.2%, the fastest rate of growth in the EEC. Some moderation is expected for 1988, primarily as a result of growing net imports acting as a drag on GDP. Nonetheless, a higher than average growth rate for 1988 of around 4.2% is expected.

In 1989, faced with the continuing need to reduce the burden of government debt, the Socialist government will probably take a more neutral stance and growth could slow further to 3.5%.

The main area of concern at present is the high unemployment rate, which at 19.4% is one of the highest in Europe.

Considerable progress has been made by the Spanish authorities in the battle against inflation. A tight monetary stance involving high interest

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rates has been the key to this success. However, the target of 3% inflation by the end of 1988 seems unrealistic. The latest figures (for July) show inflation running at 4.6%.

3. Software and Services Industry Commentary

The Spanish market is forecast by INPUT to grow from Pta 139 billion ($1140 million) in 1988 to reach Pta 386 billion ($3.2 billion) by 1993. This five-year forecast reflects a compound annual growth rate for the period 1988 to 1993 of approximately 23%.

This is the highest growth rate of any of the country markets in Western Europe, and is an indication of the fast pace of development of the Spanish computer industry in general.

Exhibit V-112 illustrates these figures and gives the individual compound annual growth rates and market sizes, of the six distinct market sectors identified, over the same period.

EXHIBIT V-112

SOFTWARE AND SERVICES MARKET FORECAST, 1988-1993 SPAIN

Subsector	Market Forecast (Pta Millions)			
	1987	1988	1988-1993 CAGR (Percent)	1993
Processing Services	20,760	23,870	12	42,810
Network Services	1,820	2,180	47	15,060
Software Products	34,000	43,140	25	132,280
Professional Services	28,950	36,470	24	106,910
Systems Integration	3,035	4,850	29	17,600
Turnkey Systems	24,000	29,490	21	76,460
Total (rounded)	112,560	140,000	23	391,000

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INPUT's more detailed forecasts for the individual sectors of the Spanish software and services market are given in Exhibits V-113 to V-116.

EXHIBIT V-113

PROCESSING SERVICES MARKET FORECAST, 1988-1993 SPAIN

Subsector	Market Forecast (Pta Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Transaction, Utility and Other Services	19,560	22,430	12	39,230
Facilities Management	1,200	1,440	20	3,580
Total	20,760	23,870	12	42,810

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EXHIBIT V-114

SOFTWARE PRODUCTS MARKET FORECAST, 1988-1993 SPAIN

Subsector	Market Forecast (pta Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Hardware Manufacturers				
Systems	18,000	22,680	24	67,000
Applications	4,000	5,160	27	17,240
Subtotal	22,000	27,840	25	84,240
Independents				
Systems	3,500	4,420	24	12,940
Applications	8,500	10,880	26	35,100
Subtotal	12,000	15,300	26	48,040
Total Market				
Systems	21,500	27,100	24	79,940
Applications	12,500	16,040	27	52,340
Total	34,000	43,140	25	132,280

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EXHIBIT V-115

PROFESSIONAL SERVICES MARKET FORECAST, 1988-1993 SPAIN

Subsector	Market Forecast (Pta Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
IS Consultancy	3,950	4,980	23	14,240
Custom Software Development	22,000	27,810	24	82,820
Education and Training	2,400	2,950	22	7,900
Facilities Management	600	730	22	1,950
Total	28,950	36,470	24	106,910

EXHIBIT V-116

TURNKEY SYSTEMS MARKET FORECAST, 1988-1993 SPAIN

Subsector	Market Forecast (Pta Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
System Hardware	12,500	14,940	17	32,600
Software and Other Charges	11,500	14,550	25	43,860
Total	24,000	29,490	21	76,460

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4. Competitive Environment

Exhibit V-117 shows the leading information services vendors in Spain, together with their revenues and market shares.

EXHIBIT V-117

TOP VENDOR RANKINGS AND MARKET SHARES, 1987
SOFTWARE AND SERVICES
SPAIN

Rank	Company	Market Share (Percent)	Estimated Revenues (Pta Millions)
1	IBM	15.1	17,000
2	ENTEL	4.8	5,400
3	Unisys	4.5	5,000
4	CCS	4.0	4,450
5	Sema Metra Iberica	3.1	3,500
6	Nixdorf	2.7	3,000
7	ERIA	2.4	2,700
8	GSI/SERESCO	2.4	2,700
9	Logic Control	2.2	2,500
10	T&G Iberica	2.0	2,300
	Others	56.8	63,770
	Total	100.0	112,320

The largest company in the Spanish market, ENTEL, is owned by the Spanish telephone company (CTNE). ENTEL's activities are mainly in processing and network services. ENTEL owns 35% of IBERMATICA, another leading information services vendor.

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The second biggest firm, CCS, is partly owned by the French company CISI.

A number of other French vendors have significant shares of the Spanish market. Sema Metra (now part of the Anglo-French Sema Group) owns Sema Metra Iberica (consisting of Sofemasa and General de Informatica). GSI's Spanish subsidiary is GSI SERESCO. CGI Informatica is owned by the French company CGI (Compagnie Generale d'Informatique).

Cap Gemini Sogeti is (perhaps surprisingly) not as well established in Spain as some of its French competitors. Its revenues in 1987 were around 430 million pesetas.

The INISEL Group owns several information services companies. The largest of these are ERIA and ISEL.

The Logic Control Group is the largest privately owned Spanish information services company.

While the main foreign players in the Spanish market are French companies, more interest is now being shown by vendors from other countries.

O Dati is the Spanish subsidiary of the Italian O Group. Its revenues in 1987 were 600 million pesetas, more than twice the 1986 figure.

The German software products company, Software AG, set up in Spain in 1985. It reported revenues of over 1 billion pesetas in 1987.

American companies are also beginning to see Spain as an important market for the future.

In general, Spanish-owned information services companies are not very strong outside of Spain. For most of them, any foreign revenues they may have come from Portugal or Latin America.

N

Rest of Europe—Market Commentary

1. General Introduction

INPUT estimates that in 1987 the software and services market in the Rest of Europe was $320 million. The Rest of Europe comprises the remaining small markets in Western Europe (notably Ireland, Portugal and Greece), accounting for only 0.9% of the total European market. This represents some 0.27% of the worldwide market of $120 billion. Software and services market estimates by country are shown in Exhibit III-13, earlier in this report.

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2. Economic Environment

a. Ireland

After the poor economic performance of the early 1980s, when the economy contracted by an average 1% per annum, the last 18 months have seen a fundamental change in Ireland's economic climate. GNP grew by over 3% in 1987, supported by a 14% increase in the volume of exports.

The government's deflationary fiscal policies have reduced the ratio of borrowing to GNP to its lowest for 10 years, while inflation of 1.8% in the first quarter of 1988 was the lowest in 25 years.

The level of government debt per capita is still one of the highest in the world. Tackling this problem has been the overriding aim of the present government.

A continuation of the present fiscal stance will keep domestic demand very weak. Net trade is once more likely to provide a significant positive contribution to GNP growth as the export boom shows little sign of stopping. The net effect is for the economy to have a zero rate of growth in 1988.

The recovery in Ireland's economy has taken place against a background of a buoyant world economy. Any downturn , particularly in the U.K. which still takes 40% of Irish exports, would exacerbate the problems in Ireland, especially unemployment. Ireland's unemployment rate, at 19%, is one of the highest in Europe.

b. Portugal

Since its accession to the EEC, Portugal has benefited enormously from the stimulus that membership provides. Real GDP grew by 5.1% in 1987, well above the EEC average and another respectable performance is expected in 1988.

The level of public sector debt remains a burden on the Portuguese economy although steps have been taken, with some success, to bring the problem under control. As a proportion of GDP, public sector debt fell to 10.9% in 1987 after a peak of 24.3% in 1982.

Inflation has been successfully reduced from over 25% in 1983 to 9.4% in 1987, with another slight decrease (to about 8.5%) expected for 1988.

As a result of a deteriorating trade balance, the current account of the balance of payments could move back into a deficit position in 1989. The forecast is for a modest shortfall in 1988 of $100 million widening to almost $1 billion in 1989.

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c. Greece

Real GDP fell by 0.5% in 1987, primarily as a result of the government's stabilisation programme but also due to a severely depressed agricultural sector. However, confidence in the Greek economy is improving, particularly in the business sector where investment is expected to provide the main impetus to growth this year.

The government is currently pursuing a more relaxed fiscal policy and has introduced various tax reforms to try to stimulate private sector consumption. The upturn in domestic demand should be reflected in a modest growth in GDP both in 1988 and 1989 of about 1.5%.

The size of the public sector deficit is one of the major issues currently facing the Greek government. Another problem is inflation, though this has fallen from 15.7% at the end of 1987 to a level of 11.8% by the third quarter of 1988. It is still well above the EEC average, however, and significant progress in the next few years is unlikely.

3. Information Services Industry Commentary

The market size in the the Rest of Europe market is forecast by INPUT to grow from $400 billion in 1988 to reach $1,050 million by 1993. This five-year forecast reflects a compound annual growth rate for the period 1988 to 1993 of approximately 22%.

The Rest of Europe represents less than one percent of the total Western European market. Detailed forecast tables are not shown for the individual countries. However, the 1988 figure is broken down roughly as follows:

Ireland	60%
Portugal	25%
Greece	15%

Growth for the Rest of Europe is expected to be higher than the European average. Portugal and Greece are very undeveloped markets, and growth will consequently be high. The Irish market should grow at about the European average, but if economic conditions are favourable, stronger growth rate could be seen.

Exhibit V-118 illustrates these figures and gives the individual compound annual growth rates and market sizes, of the six distinct market sectors identified, over the same period.

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EXHIBIT V-118

SOFTWARE AND SERVICES MARKET FORECAST, 1988-1993 REST OF EUROPE

Subsector	Market Forecast ($ Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Processing Services	50	56	8	80
Network Services	13	25	29	90
Software Products	95	120	24	350
Professional Services	79	99	23	280
Systems Integration	11	12	33	50
Turnkey Systems	67	82	20	200
Total	315	395	22	1,050

INPUT's more detailed forecasts of the individual sectors of the Rest of Europe software and services market are given in Exhibits V-119 to V-122.

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EXHIBIT V-119

PROCESSING SERVICES MARKET FORECAST, 1988-1993 REST OF EUROPE

Subsector	Market Forecast ($ Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Transaction, Utility and Other Services	47	52	7	72
Facilities Management	3	4	15	8
Total	50	56	8	80

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EXHIBIT V-120

SOFTWARE PRODUCTS MARKET FORECAST, 1988-1993 REST OF EUROPE

Subsector	Market Forecast ($ Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
Hardware Manufacturers				
Systems	50	60	25	180
Applications	12	20	20	50
Subtotal	62	80	24	230
Independents				
Systems	10	10	25	30
Applications	23	30	25	90
Subtotal	33	40	27	130
Total Market				
Systems	60	80	21	210
Applications	35	40	28	140
Total	95	120	24	350

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EXHIBIT V-121

PROFESSIONAL SERVICES MARKET FORECAST, 1988-1993 REST OF EUROPE

Subsector	Market Forecast ($ Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
IS Consultancy	12	15	23	42
Custom Software Development	60	75	23	212
Education and Training	5	6	26	20
Facilities Management	2	2	20	6
Total	79	99	23	280

EXHIBIT V-122

TURNKEY SYSTEMS MARKET FORECAST, 1988-1993 REST OF EUROPE

Subsector	Market Forecast ($ Millions) 1987	1988	1988-1993 CAGR (Percent)	1993
System Hardware	35	40	16	90
Software and Other Charges	32	40	23	120
Total	67	80	20	200

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4. Ireland—Industry Environment

The Irish market for software and services is the largest of those included in the Rest of Europe category. INPUT estimates that the market was worth about IR£120 million ($170 million) in 1987. The growth rate over the next five years are expected to be in the region of 20% per annum, but this depends to a large extent on the success of the government's economic policies and on the support it gives to the Irish software industry.

Altogether, there are more than 100 software development firms in Ireland, excluding software teams run by hardware teams. These companies employ a total of about 3,000 people. The high output of computer science graduates from the universities and colleges means that Irish companies do not face the same shortages and high turnover of staff experienced in some other countries.

Because of the relatively small size of the Irish market, many of the more successful Irish companies derive significant revenues from export activities. These include the software product companies, Kindle and Dillon Technology.

Many major American software product companies have development and manufacturing operations in Ireland. These include Lotus, Microsoft and Ashton-Tate. Apple also has a software subsidiary, called Claris Ireland, located in Dublin. This was set up in 1987 to coordinate the "localisation" of software packages for the European market in ten different languages.

A number of British companies also have Irish subsidiaries that provide products and services to both the home and export markets. Among these are Hoskyns and BIS (now owned by the U.S. company NYNEX).

The Irish government and the Information and Computing Services Association (ICSA) are expected to announce shortly (early 1989) some policy proposals for the future development of the Irish software industry. This follows the closure in May 1988 of the National Software Centre, a body set up in 1983 to increase the pace of development of the Irish software industry and to exploit the potential for growth in international markets.

Recent crises in three of the country's largest software firms lend an extra importance to the forthcoming policy proposals. Since September 1988 MSA Medium Systems (previously known as RTS Software) has closed down completely, Software Laboratories has embarked on a harsh survival plan that involved laying off of most of its staff, and sister companies COPS Ltd and COPS Europe have been placed in receivership. All of these firms, at their peak, were ranked among the largest employers in the Irish software industry.

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The dependence of Irish firms on the export market appears to make them particularly vulnerable. Selling abroad is expensive and the industry is notoriously undercapitalised. Irish software companies have long complained that they have been held back by the failure of banks and venture capitalists to support their business schemes.

What is striking about the recent problems is that they have hit mature companies from the top tier, all of which had secured venture capital and substantial state support.

Small software firms with few staff seem less vulnerable than large ones. This is because they can keep trading by switching from one line of business to another when they encounter problems. Bigger players, on the other hand, rise and fall with their products.

A factor that may have damaged MSA, Software Laboratories and COPS is that their products were less specialised than those on offer from most smaller firms. All three catered for general-purpose business applications such as accounting and stock control instead of targeting vertical markets.

Irish companies established since the early 1980s have been more careful to concentrate on niche markets. Some of the most recent start-ups have avoided the risks of product development completely, offering instead their skills for contract work for large information technology suppliers or for big financial or manufacturing organisations.

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A

Appendix: Defintions

Appendix: Definition of Terms

A

Revenue

- *Captive Computer Services Revenue* - Revenue received from users who are part of the same parent corporation as the vendors.

- *Noncaptive Computer Services Revenue* - Revenue received for computer services provided from users who are not part of the same parent corporation as the vendor.

- Other Revenue - Revenue derived from lines of business other than those defined above.

- *Total Company Revenue* - Revenue received from total computer services and other sources of revenue.

- *Total Computer Software and Services Revenue* - Revenue received from services provided by vendors that perform data processing using the vendors' computers (processing services), assist users to perform such functions on their own computers (software products and/or professional services), provide a combination of hardware and software integrated into a total system (turnkey systems), include consulting, education and training, programming analysis, and facilities management (professional services), provide for systems design, integration and installation (systems integration), or offer network, enhanced management services, electronic mail, electronic data interchange, or electronic information services (network services).

B

Service Modes

- *Processing Services*

  - Transaction Services: uses vendor equipment and software at vendor-site or customer site, may be interactive or remote-batch-oriented.

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- Utility Services: access to basic software tools enabling the users to develop their own problem solutions (language compilers,assemblers, DBMS, sorts, scientific library routines, etc).

- Other Services: carry-in batch processing, computer output microfilm services (COM), data entry services, disaster recovery/backup services.

- Facilities Management (Systems Operations): vendor provides a complete operating information system for customer including equipment, software, personnel and facilities.

• *Professional Services* - Management consulting activity related to EDP systems consulting, production of custom software, education and training, and systems operations of client-owned computers (formerly identified as facilities management) where the vendor provides human resources to operate and manage the client facility.

• *Systems Integration* - delivery of large, multidisciplinary, multivendor systems, incorporating some or all of these functions: systems design, programming, integration, equipment, networks, installation and acceptance. Systems can encompass multiple product delivery modes.

• *Software Products*

- Systems software and/or applications software packages purchased by users.

  ° Systems Software Products

    Systems Control Software: operating systems, communications monitors, network control, library control, windowing, access control, security, etc.

    Data Center Management Software: capacity management, scheduling, job accounting, performance monitors, tape management, utilities, downtime repair monitoring management, etc.

    Application Development Tools Software: application generators, assemblers, compilers, 4GLs, automated documentation, languages, translators, database management systems, data dictionaries.

  ° Applications Software Products

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Cross-Industry Applications Software: used by clients in many or all vertical markets (i.e.-payroll, word processing, spread sheets, accounts receivable).

Industry-Specific Applications Software: unique to a specific vertical market and sold into that market only (i.e., demand deposit accounting, MRP II, hospital patient tracking).

- *Network Services*

  - Network Management and Enhanced Services: network management functions, network transmission facilities, augmented with computerized switching and features such as packet switching, electronic mail, store-and-forward message switching, terminal interface and error detection and correction.

  - Network Applications

    - Electronic Data Interchange (EDI): application-to-application electronic communication, based on established business document standards.

    - E-Mail: a range of services that transmits documents consisting of text and graphic material to be read by a person—with the quality of document being high.

    - All other application services in which the network is the principal part of the service, e.g., electronic funds transfer and some videotex services.

- *Electronic Information Services*

  - Databases that provide specific information via terminal-based inquiry such as stock prices, legal precedents, economic indicators, airline schedules, etc.

  - News services that offer current information, either general or for a specific category; i.e., financial or political

  - Other services that provide interactive access to data bases and offer the inquirer the capability to send as well as receive information for such purposes as home shopping, home banking, travel reservations, etc.

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- *Turnkey Systems* - an integration of systems software, packaged or customized applications software, CPU, equipment, and peripherals. These systems are developed to meet a specific set of user requirements. The value added by the vendor is primarily in the software, either packaged or custom developed. Most CAD/CAM systems and many small business systems are turnkey systems. This does not include specialized hardware systems such as word processors, cash registers, and process control systems.

C

Other Considerations

When questions arise about the proper place to count certain user expenditures, INPUT addresses them from the user viewpoint. Expenditures are then categorised according to what users perceive they are buying.

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B

Appendix: List of Related INPUT Reports

B

Appendix: Related INPUT Reports

- *Applications Software Opportunities—Western Europe, 1988-1993*
- *Toward the Fifth Generation—European Market Opportunities, 1988-1993*
- *Network Services—Western European Market Opportunities, 1988-1993*
- *Information Systems Education and Training—Western Europe, 1988-1993*
- *Commercial Systems Integration—Western Europe, 1988-1993*
- *U.S. Information Services Industry Report, 1988*

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C

Appendix: Detailed Forecast Data

SOFTWARE AND SERVICES MARKET FORECAST BY MARKET SEGMENT, 1988-1993 FRANCE

Segment	1987 (FF Millions)	1987-1988 Growth (Percent)	FF Millions						CAGR 1988-1993
			1988	1989	1990	1991	1992	1993	
Processing Services	10,500	5	11,010	11,511	11,986	12,436	12,858	13,201	4
Network Services	1,380	38	1,904	2,476	3,169	3,993	4,951	6,139	26
Software Products	12,580	25	15,669	19,347	23,718	28,872	34,899	41,723	22
Professional Services	19,120	22	23,364	28,335	34,348	41,317	49,266	58,183	20
Systems Integration	1,735	23	2,146	2,747	3,517	4,501	5,717	7,260	28
Turnkey Systems	9,195	18	10,852	12,746	14,926	17,428	20,290	23,952	17
Total	54,510	19	64,946	77,163	91,664	108,548	127,981	150,158	18

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EXHIBIT C-2

SOFTWARE AND SERVICES MARKET FORECAST BY MARKET SEGMENT, 1988-1993 WEST GERMANY

Segment	1987 (DM Millions)	1987-1988 Growth (Percent)	DM Millions						CAGR 1988-1993
			1988	1989	1990	1991	1992	1993	
Processing Services	2,460	8	2,651	2,831	3,009	3,170	3,325	3,480	6
Network Services	175	52	266	356	471	612	783	979	30
Software Products	3,845	23	4,735	5,795	7,033	8,493	10,219	12,184	21
Professional Services	3,052	21	3,705	4,458	5,342	6,365	7,510	8,793	19
Systems Integration	545	27	692	879	1,116	1,418	1,786	2,242	26
Turnkey Systems	2,735	18	3,241	3,814	4,456	5,215	6,060	6,991	17
Total	12,812	19	15,290	18,133	21,428	25,273	29,684	34,668	18

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EXHIBIT C-3

SOFTWARE AND SERVICES MARKET FORECAST BY MARKET SEGMENT, 1988-1993 UNITED KINGDOM

Segment	1987 (£ Millions)	1987-1988 Growth (Percent)	£ Millions						CAGR 1988-1993
			1988	1989	1990	1991	1992	1993	
Processing Services	517	8	558	601	644	689	734	780	7
Network Services	165	32	218	283	365	468	594	742	28
Software Products	970	24	1,203	1,480	1,812	2,209	2,673	3,199	22
Professional Services	1,200	23	1,470	1,787	2,163	2,607	3,125	3,718	20
Systems Integration	205	25	256	320	400	500	621	763	24
Turnkey Systems	680	19	808	955	1,122	1,316	1,536	1,780	17
Total	3,737	21	4,513	5,426	6,507	7,789	9,283	10,980	19

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EXHIBIT C-4

SOFTWARE AND SERVICES MARKET FORECAST BY MARKET SEGMENT, 1988-1993 ITALY

Segment	1987 (LR Billions)	1987-1988 Growth (Percent)	LR Billions						CAGR 1988-1993
			1988	1989	1990	1991	1992	1993	
Processing Services	980	9	1,068	1,154	1,243	1,334	1,428	1,525	7
Network Services	75	73	130	180	243	321	415	531	33
Software Products	1,540	26	1,933	2,400	2,960	3,635	4,444	5,413	23
Professional Services	1,425	25	1,784	2,223	2,749	3,374	4,119	4,982	23
Systems Integration	170	20	204	261	334	428	548	701	28
Turnkey Systems	1,165	22	1,421	1,725	2,083	2,505	2,998	3,565	20
Total	5,355	22	6,539	7,943	9,613	11,596	13,951	16,717	21

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EXHIBIT C-5

SOFTWARE AND SERVICES MARKET FORECAST BY MARKET SEGMENT, 1988-1993 SWEDEN

Segment	1987 (SK Millions)	1987-1988 Growth (Percent)	SK Millions						CAGR 1988-1993
			1988	1989	1990	1991	1992	1993	
Processing Services	2,225	8	2,397	2,259	2,733	2,905	3,074	3,240	6
Network Services	107	88	201	282	375	491	628	785	31
Software Products	1,725	25	2,160	2,677	3,305	4,063	4,963	6,033	23
Professional Services	2,012	23	2,475	3,014	3,629	4,333	5,133	6,024	19
Systems Integration	157	20	188	239	304	389	494	627	27
Turnkey Systems	1,360	19	1,625	1,929	2,273	2,659	3,090	3,564	17
Total	7,586	19	9,048	10,700	12,618	14,840	17,383	20,273	17

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SOFTWARE AND SERVICES MARKET FORECAST BY MARKET SEGMENT, 1988-1993 DENMARK

Segment	1987 (DK Millions)	1987-1988 Growth (Percent)	DK Millions						CAGR 1988-1993
			1988	1989	1990	1991	1992	1993	
Processing Services	1,860	8	2,004	2,139	2,274	2,406	2,534	2,658	6
Network Services	104	27	132	188	266	378	533	747	41
Software Products	1,440	25	1,803	2,235	2,759	3,392	4,143	5,016	23
Professional Services	1,512	23	1,866	2,276	2,743	3,279	3,891	4,580	20
Systems Integration	117	18	138	170	211	264	330	410	24
Turnkey Systems	1,140	19	1,362	1,617	1,905	2,229	2,590	2,987	17
Total	6,173	18	7,306	8,624	10,157	11,948	14,021	16,398	18

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EXHIBIT C-7

SOFTWARE AND SERVICES MARKET FORECAST BY MARKET SEGMENT, 1988-1993 NORWAY

Segment	1987 (NK Millions)	1987-1988 Growth (Percent)	NK Millions						CAGR 1988-1993
			1988	1989	1990	1991	1992	1993	
Processing Services	1,430	6	1,520	1,608	1,694	1,780	1,866	1,953	5
Network Services	80	41	113	150	197	254	322	402	29
Software Products	1,125	23	1,381	1,684	2,045	2,483	2,996	3,612	21
Professional Services	1,183	21	1,434	1,720	2,048	2,418	2,845	3,321	18
Systems Integration	86	31	113	137	166	200	237	280	20
Turnkey Systems	890	18	1,048	1,225	1,428	1,652	1,906	2,183	16
Total	4,794	17	5,609	6,524	7,577	8,786	10,173	11,752	16

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EXHIBIT C-8

SOFTWARE AND SERVICES MARKET FORECAST BY MARKET SEGMENT, 1988-1993 FINLAND

Segment	1987 (FM Millions)	1987-1988 Growth (Percent)	FM Millions						CAGR 1988-1993
			1988	1989	1990	1991	1992	1993	
Processing Services	860	9	938	1,015	1,093	1,173	1,254	1,335	7
Network Services	56	31	73	96	125	161	206	262	29
Software Products	660	26	830	1,029	1,270	1,561	1,907	2,308	23
Professional Services	706	24	875	1,071	1,296	1,555	1,852	2,188	20
Systems Integration	30	28	40	54	72	97	130	174	33
Turnkey Systems	530	20	639	761	901	1,058	1,235	1,431	17
Total	2,842	19	3,395	4,026	4,757	5,605	6,584	7,698	18

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EXHIBIT C-9

SOFTWARE AND SERVICES MARKET FORECAST BY MARKET SEGMENT, 1988-1993 NETHERLANDS

Segment	1987 (Dfl Millions)	1987-1988 Growth (Percent)	Dfl Millions						CAGR 1988-1993
			1988	1989	1990	1991	1992	1993	
Processing Services	760	6	806	846	884	919	951	980	4
Network Services	110	42	156	198	242	293	351	415	22
Software Products	955	24	1,184	1,457	1,785	2,178	2,639	3,184	22
Professional Services	1,230	22	1,499	1,808	2,163	2,568	3,023	3,528	19
Systems Integration	92	38	127	165	208	258	315	378	24
Turnkey Systems	775	18	918	1,080	1,261	1,461	1,680	1,918	16
Total	3,922	20	4,690	5,555	6,543	7,677	8,959	10,403	17

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EXHIBIT C-10

SOFTWARE AND SERVICES MARKET FORECAST BY MARKET SEGMENT, 1988-1993 BELGIUM

Segment	1987 (BF Millions)	1987-1988 Growth (Percent)	BF Millions						CAGR 1988-1993
			1988	1989	1990	1991	1992	1993	
Processing Services	7,360	6	7,802	8,192	8,560	8,903	9,214	9,491	4
Network Services	1,335	29	1,722	2,187	2,734	3,363	4,035	4,762	23
Software Products	9,950	25	12,390	15,304	18,828	23,060	28,055	33,993	22
Professional Services	12,290	23	15,094	18,821	21,971	26,201	31,003	36,365	19
Systems Integration	1,485	36	2,020	2,575	3,244	4,023	4,908	5,900	24
Turnkey Systems	8,070	19	9,621	11,363	13,322	15,504	17,909	20,533	16
Total	40,490	20	48,640	57,902	68,660	81,054	95,125	111,043	18

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EXHIBIT C-11

SOFTWARE AND SERVICES MARKET FORECAST BY MARKET SEGMENT, 1988-1993 SWITZERLAND

Segment	1987 (SF Millions)	1987-1988 Growth (Percent)	SF Millions					CAGR 1988-1993
			1988	1989	1990	1991	1992	1993	
Processing Services	310	8	335	358	380	401	422	443	6
Network Services	86	23	106	126	147	169	191	212	15
Software Products	575	23	710	868	1,054	1,272	1,531	1,825	21
Professional Services	462	22	564	683	821	980	1,162	1,358	19
Systems Integration	38	40	53	70	91	114	143	177	28
Turnkey Systems	360	19	428	505	591	691	803	927	17
Total	1,831	20	2,197	2,611	3,082	3,628	4,252	4,942	18

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EXHIBIT C-12

SOFTWARE AND SERVICES MARKET FORECAST BY MARKET SEGMENT, 1988-1993 AUSTRIA

Segment	1987 (Sch Millions)	1987-1988 Growth (Percent)	Sch Millions						CAGR 1988-1993
			1988	1989	1990	1991	1992	1993	
Processing Services	1,520	8	1,642	1,757	1,862	1,969	2,077	2,181	6
Network Services	90	85	167	236	326	440	586	776	36
Software Products	2,370	23	2,915	3,563	4,324	5,221	6,282	7,490	21
Professional Services	1,815	21	2,205	2,653	3,188	3,807	4,513	5,312	19
Systems Integration	140	36	190	249	322	409	511	638	27
Turnkey Systems	1,490	18	1,766	2,078	2,428	2,842	3,303	3,810	17
Total	7,425	20	8,884	10,536	12,450	14,688	17,272	20,208	18

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EXHIBIT C-13

SOFTWARE AND SERVICES MARKET FORECAST BY MARKET SEGMENT, 1988-1993 SPAIN

Segment	1987 (Pta Millions)	1987-1988 Growth (Percent)	Pta Millions						CAGR 1988-1993
			1988	1989	1990	1991	1992	1993	
Processing Services	20,760	15	23,874	27,336	31,026	34,904	38,918	42,810	12
Network Services	1,820	20	2,184	3,058	4,434	6,739	10,243	15,058	47
Software Products	34,000	27	43,137	54,725	69,130	86,644	107,739	132,284	25
Professional Services	28,950	26	36,469	45,783	57,238	71,045	87,490	106,907	24
Systems Integration	3,035	60	4,856	6,458	8,396	10,831	13,864	17,607	29
Turnkey Systems	24,000	23	29,485	36,031	43,891	53,193	64,004	76,457	21
Total	112,565	24	140,005	173,391	214,114	263,356	322,258	391,122	23

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EXHIBIT C-14

SOFTWARE AND SERVICES MARKET FORECAST BY MARKET SEGMENT, 1988-1993 REST OF EUROPE

Segment	1987 ($ Millions)	1987-1988 Growth (Percent)	$ Millions						CAGR 1988-1993
			1988	1989	1990	1991	1992	1993	
Processing Services	50	11	56	61	66	71	75	80	8
Network Services	13	92	25	35	45	58	72	90	29
Software Products	95	26	120	151	189	235	289	352	24
Professional Services	79	25	99	123	153	188	230	280	23
Systems Integration	11	13	12	15	19	26	36	50	33
Turnkey Systems	67	23	82	100	120	143	171	202	20
Total	315	26	394	485	592	721	873	1,055	22

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D

Appendix: Reconciliation

D

Appendix: Reconciliation

The same basic research methodology was used to develop the market size estimates and growth forecasts as in previous years. This methodology is discussed in Chapter I of this report.

However, in the 1988 survey, two new delivery modes were added to the four modes measured during 1987. These were systems integration and network services. In addition to these two major additions, a number of other smaller definitional changes were made, all with the aim of more realistically and usefully analysing the computer software and services market. These changes are described below:

- Processing Services. Network services have been removed from this sector, leaving two subsectors:

  - Transaction, utility and other services, called processing services in the 1987 report.

  - Facilities management or operations management.

- Network Services. This sector, previously denoted as value-added network services, has been analyzed into three submodes.

  - Managed network services
  - Network applications
  - Electronic information services

- Software Products. The definition of this sector has not changed.

- Professional Services. This sector has now been redefined to exclude the professional services element of systems integration contracts (previously included) and to include the contract staff subsector within the custom software development subsector.

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- Systems Integration. This has now been established as an independent delivery mode and comprises all products and services provided under such contracts, namely:

  - Hardware and software products
  - Professional services
  - All other service, e.g., processing services

- Turnkey Systems. The definition of this sector has not changed.

The reconciliation of the analysis for 1987 in this report against that given in INPUT's previous report in this series, *The Western European Market for Information Services—Analysis and Forecasts, 1987-1992* (SAFE), is given in Exhibit D-1.

The major difference between the two market assessments shown in Exhibit D-1 (some 15% of the 1987 report figure) is accounted for as follows:

- Changes in the exchange rates used for consolidating individual country market totals in U.S. dollars accounts for about 11% of the difference overall.

- INPUT has increased its estimate of the size of the overall software products market by about 5% in the case of systems software and by about 10% in the case of applications products.

- The systems integration sector has been separately identified, and a new evaluation of its size has been made with inclusion of the system hardware, software products and other services provided as part of these contracts. The 1987 report figure of $450 million only represents the professional services aspect of systems integration contracts.

In addition it should be noted that EIS (electronic information services), separately identified in this report, were included within the processing services total shown in the 1987 report. Other smaller differences are accounted for by reassessment by INPUT of the sector size.

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EXHIBIT D-1

THE WESTERN EUROPEAN COMPUTER SOFTWARE AND SERVICES MARKET 1987-1988 RECONCILIATION

	Assessment of 1987 Market Size ($ Millions)	
	1987 Report	1988 Report
Processing Services		
- Transaction Utility, and Other Services	6,220	6,410
- Facilities Management	390	400
Network Services		
- Managed Network Services		35
- Network Applications	360	320
- EIS	-	535
Software Products		
- Systems	5,220	6,060
- Applications	2,745	3,360
Professional Services		
- Consultancy	1,150	1,280
- Custom Software	7,105	7,930
- Education & Training	1,130	1,145
- PS FM	80	95
Systems Integration	450	1,270
Turnkey	6,175	6,860
Total	31,025	35,700

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E

Appendix: Analysis of Research Sample

E

Appendix: Analysis of Research Sample

Interviews were conducted amongst a wide cross-section of computer software and services vendors in Western Europe with the specific objective of obtaining quantitative data on their financial performance and the sources of their revenues. Exhibit E-1 shows an analysis of the research sample by country.

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EXHIBIT E-1

ANALYSIS OF RESEARCH SAMPLE

Country	Number of Vendors Interviewed
West Germany	70
France	60
Italy	60
United Kingdom	50
Sweden	35
Norway	30
Denmark	12
Finland	18
Netherlands	40
Belgium	35
Switzerland	30
Spain	40
Austria	25
Total	505

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